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METHOD IN THE USE OF TEST LENSES.

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From the absence of any allusion to methods of using the trial glasses in books on refraction, it might be supposed that special instruction in this direction was quite unnecessary. But experience has shown that accurate and reliable measurements are only to be obtained by carefully planned and systematic employment of the test lenses. This is the case even when after the use of a mydriatic, it is supposed that only the proper glass will be accepted, or will give full vision. Any one with experience in this matter must realize the difference of results obtained by different observers, or even by the same observer at different times.

Very much depends on the power of the observer to deal with the mental characteristics of the patient, but as a foundation on which to build this special skill, which can only be acquired by large experience, as an essential before such experience can give special skill, certain simple principles must be applied in the use of the trial glasses.

First, the test should be completed as quickly as possible. Neither the patient or surgeon can keep the attention closely applied for any considerable length of time without lapsing into periods of comparative inattention, when inaccurate observations and

confusion will follow. To arrive at the desired result with the trial glasses before the patient or surgeon are tired, it is essential to have approximated the correction needed by other methods. Here is the principal field for the other tests for refraction. My own plan is, after opthalmoscopic examination, which gives an approximation to the refraction, to employ the ophthalmometer, and then the shadow-test. In this way the correcting lens is determined, usually within a limit of 0.50 D. of inaccuracy. The trial with test lenses is then begun by placing this approximate correction before the eye, finding what vision it gives, and then endeavoring to improve it.

Where, for any reason, it is found necessary to considerably prolong the trial with the lenses [and the absolute length of time to which this will apply, varies greatly with different persons], it is better to postpone the completion of the tests either for an hour or more, or until a subsequent day. The essential thing is to have the patient comparatively fresh when the final test is made.

The instantaneous change from one glass to another, where the distinctness of vision is to be a matter of comparison by the patient, is not less important than the completion of the test before the patient's attention is exhausted. The accuracy and reliability of the patient's discrimination between two lenses is proportioned to the rapidity with which the impression received through the second succeeds the impression received through the first. It is, of course, impossible to have the two impressions entirely simultaneous, but if the change can be made instantly, it probably answers the purpose equally well. When, however, some interval occurs between the impression received through one glass, and the impression with which that is to be compared, received through the other, the certainty of the result very rapidly diminishes as the interval lengthens.

To remove one lens from the trial frame and put another in its place, necessarily requires quite an interval of time. The instant change is secured by placing in front of the lens already before the eye a convex or concave lens that will produce the desired modification. For example, if a 1. D. lens is before the eye and it is desired to compare its effects with that of the 1.25 D. lens, instead of removing the first and substituting the second, we hold in front of the first an 0.25 lens of the same kind. This instantaneously produces the desired effect.

This course of procedure, I know, is in constant use among practical workers in refraction; but its very great importance is

frequently not recognized. Indeed, any method of making the change, which requires an interval to elapse between the perception of the two impressions is almost worthless, so far as concerns the utilizing the subjective impressions of the patient.

The use of the supplementary lenses enables one also to repeat the test again and again very quickly, so that no uncertainty may remain as to the effect they produce on the acuteness of vision.

Next in importance is *the making of changes in the strength of the lens sufficiently great to decidedly affect the distinctness of vision.* In the beginning of the test, start with changes so great that the effect they produce will be unmistakable, even with the imperfect vision the patient already has. Then, as the correction is more closely approached and the vision becomes more and more distinct, the changes in the lens may be slighter, but they should always be great enough to produce a certainly perceptible change of distinctness in the test letters.

Suppose, for instance, we have to deal with 2.25 D. of hyperopia, and the glass fixed on by objective methods is convex 2. D. Begin by placing this in front of the patient's eye and testing the vision. If the vision so obtained is comparatively poor, say $\frac{6}{12}$, hold in front of it first a convex and then a concave lens of 1. D. This will produce such a decided impairment of vision that you can feel absolutely sure the proper correction is nearer 2. D. than it is to 1. D. or 3. D. That is, we have determined the refraction to be hyperopic and *to lie between certain limits* and have only to find where, within these limits, it is located. Having done this, hold weaker glasses in front of the one originally selected, as the plus and minus 0.50 D. With this, in the case supposed, it would be found that the concave made the vision worse, whereas the convex made but little change in it. This, since the changes produced by these lenses are sufficiently distinct to be recognized with certainty by the patient, will show that the convex lens originally selected, should be increased in strength rather than diminished, and, from the fact that the 0.50 D., did not decidedly improve the vision, it may be supposed that the increase need only be 0.25 D. Then follows the trial of the 2.25 D. giving full vision. But, after this, the process should be repeated, and the 0.50 D. convex and concave again tried before it. Should both show a decided and almost equal blurring, it is safe to assume that the glass before the eye is about right.

The principle of reversal. The above supposed case illustrates the application of another important point in the use of test-lenses,

a principle applied in many ways in securing accuracy in mathematical measurements; that is, both convex and concave lenses are to be tried in front of each lens, placed in the trial frame. If a convex is required, the trial of the convex may still not materially improve vision, but the trial of the corresponding concave as contrasted with it will give vision notably worse. Instead of producing an equal, though uncertain improvement, it causes an equal impairment of vision; and the contrast between the improvement and impairment makes the indication doubly certain.

Working in this way, it is often easy to determine with a 1. D. lens, 0.50 D. of required change, or even less than that. For instance, when the strength of the convex needs to be increased, though both convex and concave held in front of it make vision worse, the convex causes the less impairment. Now, a convex 1. D. causing impairment shows that the increased strength of the original lenses should be less than 0.50 D., because if 0.50 D. increase is required, the increase of 1. D. should not make vision worse; but should leave it unchanged. Hence, if the patient's vision is good enough and he is sufficiently accurate in his observations to make tests thoroughly reliable, we may, from the trial with the 1. D. lens, deduce a required change of 0.25 D.

It cannot be too strongly urged that the supplementary lenses, or the intervals between the lenses used should always be great enough to make changes of distinctness that the patient will correctly recognize. A single incorrect answer may throw the observer off the track, and require many trials to prove its falsity.

Whenever there is doubt as to the correctness of the patient's impression that a certain change makes vision better or worse, or at frequent intervals in any case, it is best to require him to say aloud the lowest row of letters of which he can make out any. This allows the surgeon to judge by the mistakes made exactly amount of improvement of vision, giving the trial most of the value of an objective-test. This, of course, consumes more time than the simple statement that a certain glass makes the letters better, or makes them worse, but it is often essential and sometimes the only thing that can be relied on.

A Regular Order of Testing: Where cylindrical lenses are to be used, it is best to try the different elements of the combination in some regular order. Thus, first try variations in the strength of the spherical, then in the strength of the cylindrical, after that in the direction of the axis of the cylinder. But after any change, in one respect, retesting the combination as to all the other factors

is necessary. Ordinarily, the order which will be found most convenient is that indicated above; but sometimes it is worth while for special reasons to change this.

In case it is doubtful if any cylinder is required, I commonly try the spherical alone, getting the best possible vision with it, and then proceed to tests with the cylinder, and I would not regard the cylinder necessary, unless it gives a distinct improvement of vision. On the other hand, if it seems that a cylinder alone may be required, the test as to its strength and the direction of axis may be gone over, before any spherical is combined with it. And the addition of the spherical is only to be decided on, if it gives clearly better vision. In any case the test is to be regarded as complete only when going over all the different factors, farther change in any one of them is found to give impairment of vision.

In ascertaining the strength of the cylinder, the same care to produce a decided change in its effect, one that will make a noticeable change in the acuteness of vision, is to be observed; and the principle of exaggeration of an error by reversal is to be applied as with spherical lenses. For this purpose the crossed cylinder which I have described in the transactions of the *American Ophthalmological Society* for 1887 possesses very decided advantages. The one should be first used which makes a change of 1. D. either way in the strength of the cylinder, and, subsequently the weaker crossed-cylinders.

In fixing the axis, the principle of reversal is applied by turning the axis first to the right, then to the left; each time carrying it on, until it produces a noticeable blurring of vision, noting the two points at which this occurs, and selecting a point midway between them as that towards which the axis should be turned. After this point has been determined with comparative accuracy, if the cylinder be of medium or high strength, the final determination of the axis can be made by leaving it fixed in the frame and rocking the frames slightly from side to side on the face.

Usually in sphero-cylindrical combinations, the spherical is the stronger lens and an inaccuracy in the spherical lens causes more impairment of vision than the same amount of error in the strength of the cylindrical. For this reason, proper adjustment of the spherical is attempted first. When, however, the strength of the cylinder is more than double that of the spherical. It is best to reverse the order and begin each time by first accurately adjusting the direction of the cylinder, then its strength, and leaving the strength of the spherical to be determined last.

While the account of such a method of using the trial set may appear complicated and the method itself unnecessarily minute, it will be found in practice that every point mentioned aids in the exactness of the determination and in the saving of time.

Tests Without a Mydriatic: When the test of an eye is to be made without the previous use of the mydriatic, in the presence of a notable power of accommodation, the avoidance of inaccuracy due to the exertion of accommodation, becomes one of the leading indications. Under these circumstances, the thing aimed at is not the combination which will give the most perfect vision, but the strongest convex or the weakest concave that will give perfect vision. While the general principles already alluded to must here be as carefully applied, the order of procedure may be somewhat varied. It is best to begin with the most accurate correction of the astigmatism obtainable by the ophthalmometer and skiascopy, combined with a spherical that will probably over-correct the hyperopia, or under-correct the myopia. And, when it comes to making the final determination, both eyes should be tested together by placing before each its supposed proper correction, and excluding them alternately from vision by covering first one, then the other by a card. This is done to determine the amount of anisometropia with the greatest possible accuracy.

SUMMARY.—In the use of test lenses, as elsewhere, definite method is necessary to obtain results of definite significance, and the best method will give the best results.

The subjective test should be completed as quickly as possible so that the power of close attention of patient and surgeon shall not be exhausted or relaxed when the final tests are made.

Changes in the strength of the lenses should be made by the alternate placing and removing of a supplementary lens in front of the one already selected.

These changes should always be sufficiently great to decidedly affect the distinctness of vision. Being in different cases and different stages of the test proportioned to the acuteness of vision obtained, and to the patient's powers of accurate observations.

The principle of reversal should be applied by alternately trying supplementary lenses of opposite kinds, or turning the axis first in one, then in the opposite direction, for this doubles the certainty and delicacy of any of the changes produced.

It is essential, from time to time, to check the answers of patient as to his impressions, by requiring him to read aloud the letters on the test card.

With cylindrical lenses, the different elements of the combination must be tried one after another in alternate order, as first the strength of spherical, then strength of cylindrical, then axis of cylinder, though this order may, for different cases, be profitably varied, and the final result is reached when no element in the combination can be changed in any way without impairing the acuteness of vision.

When the subjective test is made in the presence of accommodation, a leading indication is to avoid error that it may cause. We must seek instead of the best vision, the strongest convex or the weakest concave that will give the best vision.

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THE PERNICIOUS INFLUENCE OF ALBINISM UPON THE EYE.*

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I HAVE had the good fortune to examine and treat the eyes of two families of albinos, and the results of my studies have led me to some conclusions that I trust may be of interest and value to the profession, and, should physicians undertake to investigate the subject, may ultimately be of benefit to these most unfortunate beings.

I shall first describe my cases:

The first family is composed of rugged, healthy, normal parents, of American descent and birth, the father a strong and robust farmer, the mother an equally well-developed woman, who has borne seven children, all living and healthy, now ranging from the ages of four to twenty-two. The most diligent inquiry has failed to elicit a single instance of albinism or of pathologic taint in the ancestry of either parent; there has been no intermarriage of cousins, and nothing to lead one to suspect syphilis, intermixture of negro blood, other dyscrasia or disease abnormality to which albinism has heretofore been blunderingly ascribed.

Parents and children are all honest, hard-working, simple countryfolk, and all are remarkable for a sturdy development, a largeness and healthfulness of body, and a freedom almost remarkable from any illness during the life of each. The parents show no trace of albinism, no abnormalism of skin, hair, or eyes. Their refraction, barring beginning presbyopia, is as near emmetropic as we can find, with no hyperopic astigmatism at axis 90°.

Case I.—The oldest child, W. T., a lusty fellow of twenty-two, about six feet tall, big-boned and of rugged health, presents the typical characteristics of albinism. As to the eyes, he has great photophobia, a rapid horizontal nystagmus, and an amblyopia of $\frac{20}{100}$ each eye, and a simple hyperopic astigmatism of 5. D. (right eye) and 4. D. (left eye), axes 90°. There is possibly some divergent strabismus of the right eye.

*Read before the Ophthalological Section of the American Medical Association at its meeting in Milwaukee, June 6th, 7th, 8th and 9th, 1893.

CASE II.—The second child, L. T., a girl of twenty, albino, with nystagmus and photophobia, rivals her brothers in physical vigor and development. The refraction is:

R. + sph. 5.00 D., ⊂ + cyl. 2.50 D., ax. 100° = $\frac{20}{100}$.
L. + sph. 2.50 D., ⊂ + cyl. 2.50 D., ax. 90° = $\frac{20}{100}$.

CASE III.—The third child, L. T., a big man of eighteen, shows no sign of albinism, and has a low degree of hyperopia, with no astigmatism or other ocular abnormality, structural or functional.

CASE IV.—The fourth child, E. T., a girl of 15, a pure albino, with great photophobia and swift nystagmus, has the following error of refraction:

R. — sph. 2.50 D., ⊂ + cyl. 1.50 D., ax. 90 = $\frac{20}{100}$.
L. — sph. 2.00 D., ⊂ + cyl. 1.50 D., ax. 90 = $\frac{20}{100}$.

CASE V.—The fifth child, E. T., aged eleven, pure albino, of less robust physical vigor than the rest, has a simple hyperopic astigmatism of about seven dioptrics at vertical axes, and a visual acuity of about $\frac{10}{200}$ or $\frac{20}{200}$, with swift nystagmus and photophobia.

CASE VI.—The sixth, L.T., a girl of eight, not albinotic, has an inconsiderable hyperopia and a very slight astigmatism.

CASE VII.—R. T., the seventh child, a boy of five, is not an albino, though there is faulty opacity of the iris, with some slight nystagmus and a hyperopia of perhaps two or three dioptries.

In the second family I have examined, the non-albinotic parents are of as good stock, and of as perfect healthiness, both physical and ocular, as the first family. There have been but three children born, all good specimens of physical vigorousness.

CASE VIII.—The oldest child, a boy of twelve, is a pure albino, with 2 D. of hyperopic astigmatism (axes 100° and 80°) on top of 5 D. of hyperopia, $\frac{20}{200}$ vision, nystagmus and photophobia, with moderate convergent strabismus of the right eye.

CASE IX.—The second child, ten years of age, is not albinotic, and except a little hyperopia, presents no ocular abnormality. The little girl, Case X, aged four, is not quite the purest type of albinism, has moderate and slow nystagmus, and, as near as ascertainable, a compound hyperopic astigmatism of 2. or 3. D.

HEREDITY, so powerful in all other factors, physiological or morphological, seems, at least in the human race, to play no part in the production of albinism. In the literature I have examined this seems very evident. Darwin speaks of a family of albino children whose parents were first cousins, but this was certainly accidental, and can not be accounted as casual. In animals there are a number of species of albinos, in which the heredity

=element is indubitable. The noteworthy fact concerning my two families is that albinism appears without any discoverable cause, and writers generally agree that this usually so. Not only does the affliction strike a family like lightning out of a clear sky, but, as in both my families, there is an unaccountable alternation of albinotic and of naturally pigmented brother or sister. It is evident that there is an inviting field for investigation and even of experiment.

Physical and Mental Vigor.—The old notion that albinism is due to some general pathological element or dyscrasia is likewise false. From other reported cases and from my observation the exact reverse seems to be the truth. In animals and men albinism is apparently bound up with exceptional health and robustness. The idea also that it co-exists with cerebral or mental deficiency or disease, is just as untrue. This statement, however, requires an important modification. Biologically, vision is the very condition of mental development and existence, and with the necessary limitations the law holds as to the individual. Nothing more certainly and more thoroughly affects the mind than ocular disease or the deprivation of vision, and the highly abnormal vision of the albino is most profoundly active to hinder and abnormalize the mind, thus denied its most important means of knowledge of the external world. In this connection, however, the all-important point is the method or manner in which ocular disease produces mental abnormalism.

The Family Study gives the best field of suggestive observation, because from the babe to the adult, the progress of the morbid changes can be traced and a logical idea is thus gained of the influences and laws at work. Many brothers and sisters may in this way be correctly focussed, as it were, into one beam of light, or considered as phases or aspects of one personality and one law, the massed and unitized results standing out in more perfect relief.

Since the present writing is to be rated mostly as a suggestion to others of a fertile field and method of examination, I shall briefly state what I tentatively hold to be the law of the causes and of the effects in these cases, in order to solicit from others corroborative or contradictory facts whereby a neglected class of medical cases may be understood, and possibly much suffering forefended. I say much suffering, because if one may hazard a guess it would be that there are thousands of albinos in the United States, and for this frightful affliction I can not learn that ophthalmological

science has either sought to learn the pathology of albinotic diseases, nor has ophthalmological art turned a finger towards their prophylaxis therapeutics.

THE CAUSE OF ALBINISM, in the present condition of our knowledge, is entirely undiscoverable. The failure of the epiblast to secrete the usual pigment cells is a mystery of molecular physiology that the future must solve.

THE PATHOLOGICAL SIGNIFICANCE OF ALBINISM, lies, I believe, solely in the fact that the iris or diaphragm of the ocular camera is transparent, or so nearly so, that it does not act as a true photographic or physiological diaphragm. The white hair and skin that so vexatiously attract the attention have for the physician and for the patient absolutely no medical significance, except as regards the transparency of the lids. The skin and hair are in every way as healthy as other hair and skin normally pigmented, and serve every function quite as well. But I would also advance the theory that the absent pigmentation of the choroid has also little pathological significance, except as permitting trans-scleral illumination. In many blondes the retinal or choroidal pigment is almost or quite as fully absent as in albinos, but the iris being properly pigmented, there is no ocular disease. From non-opacity or non-pigmentation of the iris follows the entire train of evil results that afflict the albino, and from this slight cause alone. What are the evils?

PHOTOPHOBIA is the most evident and inevitable consequence of a transparent iris.* If one has endured the misery of mydriasis during a sunny day, and without the protection of colored glasses, he will have a vivid knowledge of the retinal torture that the albino

*In the autobiography of the late Lord Sherbrook of England, who was an Albino, we have the pathetic account by a great man of his sufferings from this defect. "The peculiarity of my eyes," he says, "consists in the total absence of coloring matter, this occasions of course, especially in man, a very marked peculiarity of complexion, amounting in early youth to something of effeminacy. For this evil, however, I have found age a sovereign cure; but as the absence of coloring matter extends to the eye, it necessarily occasions a great impatience of light. The eyelids must always be nearly closed and so I have never been able to enjoy the luxury of staring anyone full in the face. Of course, this intolerance of light must be attended with something very closely approaching to pain. I cannot even conceive the state of a person to whom sight is a function free from all pain and distress. But as I have no standard to measure by, I may exaggerate my own misfortune."

must always endure. With prolonged habits of eyelid and face protection, and with the wise adaptations and compensations that living tissues somehow learn, albinos, or some of them at least, develop a partial and suffering indifference to light, but most of them present the constantly painful picture of bowed heads, downcast eyes, wrinkled brows and lids, a vain endeavor to shut out the ill-defined and overpowering light=rays pouring into the retina from all sides, and which not even the lids and sclerotic can exclude as our normally-colored lids and scleras do.

Nystagmus.—The existence of Miner's nystagmus, concerning which there has of late been much discussion, has served to show that these oscillatory motions of the ball are not primarily due to central disease. It is evident that the exciting cause is the occupation and the effort of healthy cerebral centers to compensate for and overcome the peculiar and abnormal ocular labor. We have somehow grown up with the idea, unconsciously accepted, that nystagmus is always a disease, and that it starts in abnormal function of the motor centers for innervation of the external ocular muscles. But in albinos the brain is strong and healthy; it is only the eye that is abnormal. The source of the nystagmus is, I firmly believe, in these cases not central, but is peripheral, and primarily it is only a physiological attempt of the ocular mechanism to find a less faulty and blurred image of an object. Every ophthalmic surgeon has time and again seen nystagmus in the making. Children and others with corneal ulcers, or extensive maculæ of the corneæ, in searching for the diffused and faulty retinal image are constantly sweeping the eyeballs about and from side to side, in the desperate and never-to-be-renounced endeavor to locate the hazy and non-limited images. Co-operating with this cause is probably the attempt, constantly renewed, to throw the poor image that is formed upon a less illuminated portion of the retina than the macula region, in order thereby to secure a better contrast or definition. The peripheral portions of the retina are more shaded and the attempt is made to throw the image on these portions. The retina can never renounce the Sysiphean task of hunting for a more sensitive and darkened portion of its surface, and for a picture with a better definition. In this sense and at first the nystagmic motions are simple physiological endeavors to locate an almost non-localized picture, and to definitize a suggested and ever borderless image. I take it that Miner's nystagmus is due to the forced repetition a million times a day to locate a fluctuating, dim, and ever-disturbed retinal image. In albinos the lens and

dioptric media give the persistent hint rather than the sharp reality of a retinal picture, which the iris transmission of the peripheral light as certainly spoils, washing out its outlines and bathing the whole fundus oculi with ill-defined images and confusing brilliancy. Thus, like blind men's fingers that grope after hoped-for support and defense, the eyeball is kept constantly fluttering between hope and renunciation in its ceaseless necessity of search for what can never be found. When abnormal function passes over into organized habit and pathologic tissue-change, just when physiology becomes pathology, just at what time of life the proper image-definition, if it were possible to supply it, would stop the nystagmus, must be decided by future discovery and experiment. But I believe there is little room for doubt that the cause of the nystagmus is the definitionless image and diffused illumination of the fundus, caused by the transparency or translucency of the iris. This may be more than suggested by the removal of the iris in a pig's eye, and seeing the effect on the fundus image, or by diaphragmatic experiments with a camera obscura, or with the artificial eye of Perrin or Frost. The theory is about proved by the observation that in a family the nystagmic movements are slowest in the younger, and in the less albinotic irides, and are rapid in proportion to the increase of age, and of albinotic and ametropic defect. The clinical proof of therapeutics yet fails from the too evident present difficulty or impossibility of making an artificial iris, or of definitizing and delimiting the retinal image. But I have not yet despaired of this.

Ametropia.—It is commonly said in the copied, rote-repetitions of the books, that the albinotic eye is a diseased eye, the lens malformed, and everything wrong about it. It is my belief, as I have stated, that primarily there is nothing wrong with the albinotic eye except simple want of iris-pigment, and that all its other evils flow from this as a sole cause. All the albinotic eyes that I have seen are beautiful and perfect structures, except as regards this pigmentation. The scrutiny of my cases and the comparison of each member of the family-group with the whole, and with my theory as a key, goes far to prove my contention. Doing this, it is observed that the more transparent the iris and the older the patient, the greater, other things being equal, the ametropic defect. And this is very readily explained by the influence upon the eyeball of the persistent lid-pressure and blepharospasm, the cheek and forehead muscles also co-operating together with the powerful retracting forces of the external globe-muscles. The brilliancy of

diffused fundus-illumination is thus only partially lessened, but the attempt must always be kept up, even though the folded and wrinkled skin by its translucency cannot wholly effect the desired exclusion of light. Age also has its influence, as the longer the lid-pressure has been kept up the greater is the ametropia, and especially the hyperopic variety of the astigmatism. It is the axis of this astigmatism that also helps to reveal the nature of its cause. The influence of the spasm and crushing of the lids is seen only by noting that no ametropia exists in the parents; none, or comparatively none, in the non-albinotic children; more hyperopia, or rarely myopia, in the younger albinos, either of the less pure type or of relatively less physical stamina; whilst we have enormous degrees of hyperopic astigmatism about axis 90° in the older and stronger. The lids have crushed the eyeball so continuously that we have extreme corneal asymmetry at axis 90°.*

AMBLYOPIA need not detain us long to explain. It is also secondary. The unphysiological image-stimulus, and the nystagmus would in time necessarily bring about lessened visual acuity, even if it were not directly and at once the result of the diffused illumination of the whole retina, and especially of the macula-region. Continued over-stimulus and abnormal stimulus, everywhere destroys physiological reaction and blunts the delicacy of sensibility.

The combination, photophobia, nystagmus, ametropia (often also insufficiency or strabismus), and amblyopia, presents a union of four frightful ocular defects that leaves little to add of worse. It is interesting to distinguish how each is causally bound up with the other, and that there is thus formed a vicious circle of disease that tends to enlarge and increase in virulence so long as the tissue changes of the growing period of life render the ingravescence possible. But I wish to emphasize again my conviction that, each and several, these four things are directly or indirectly due to the one etiological factor, a non-pigmented iris. A non-pigmented choroid and lid may exaggerate the evil.

PROPHYLAXIS AND TREATMENT. If this be the true etiology what will be the logical attempt at therapeutics? It is evident that

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*NOTE—This causal agency is shown in the quick changes to be noted, according to my friend Dr. de Schweinitz, in the amount of astigmatism as observed by the ophthalmometer, when the lid is drawn away from the globe, or when the patient partially closes and retracts the lids, note also the power of a Meibomian cyst to change temporarily the axis of astigmatism.—*Cf. Gould, Medical News, June 3, 1893.*

as all true cure aims at extinguishing the cause of the disease, so here the one hope of individual prophylaxis and cure must lie in supplying either a pigmented iris, or an artificial substitute for the same.

As all abnormalism of so constantly reappearing a kind as general albinism of the body must have a definite cause, we are compelled in default of present knowledge of that cause to wait further scientific discovery before the prophylaxis or cure of this developmental epiblastic peculiarity is possible. In the meantime, the reported changes in individuals of pigmentation, both away from and toward albinism, give us hope that the law may be discovered, and that even a general cure is entirely possible and yet to be discovered by some brilliant investigator. There are seemingly trustworthy reports of several albinos in whom with years there was an increased pigmentation of the hair, skin, and notably of the irides.*

The old suggestion of tattooing the cornea has two decided objections: 1. The danger from the operation performed on an otherwise healthy and normal eye. In a densely leucomatous eye there is nothing to lose, but were I an albinotic patient I would hesitate to permit the tattooing of my cornea. 2. The transparent sclerotic and lid will also transmit so much light as to prevent absolute perfection of result, even though the imitation tottoo-iris were successful.

In this connection my friend, Dr. Wendell Reber of Norristown, Pa., in conversation with me suggested tattooing of the palpebral conjunctiva—a plan that would certainly aid in shutting out the light that the non-pigmented skin of the lid transmits. This might give the darkened lid a peculiar appearance, and render the sensitive patient more uncomfortable than ever—suffering as he does enough from his conspicuousness. If corneal tattooing were successful, this would certainly aid in giving relief.

A more probably successful plan may be one with which I am now experimenting: The wearing of London smoke coquilles that will cover the eyeball, and that permit enough light to pass to enable the patient to catch glimpses of objects with the peripheral portions of the retinæ. This is for purposes of safety and comfort to the patient in detecting objects not directly in front. In these coquilles I have ordered a round segment, one-sixth of an inch in diameter, exsected, directly in the line of the visual axes, and into the openings I insert transparent lenses with the patient's ametropic correction. My hope is that by this plan the peripheral portions of the retina will be shaded, the image fixed accurately

*Joseph Jones, M. D., on Fevers, p. 1163.

at the macula, and the nystagmus prevented, with the necessarily resultant cure of the amblyopia. These spectacles were given case V. Within thirty seconds after their application the girl became deathly pale, was seized with violent nausea, and would probably have swooned if the glasses had not been removed. I explain this as possibly caused by the too-sudden cessation of the nystagmus, the violent checking of an habitual and rapid innervation with consequent overflow of the innervation to other ganglionic centers, and derangement of other related functions. The experience was so frightful that the patient could not be induced to repeat it. I then had another pair of lenses made similar to the first but with the transparent lenses correcting the ametropia, five-eighths of an inch in diameter. After some trouble at first, these were worn with great comfort and delight. Observation of the pupil with these lenses in place, shows immensely diminished nystagmus. After these, with daily interruptions, had been worn for a few weeks, the first pair with the one-sixth-inch diameter lenses were applied and worn with great comfort. The girl is a school girl, and dreading the unfeeling words and acts of the scholars, she will not wear the glasses at school, but does wear them by choice mornings and evenings at home. The difficulties one meets in attempting to overcome this defect are therefore seen to be both many and great. But it is a great pleasure to know that this method does to some extent meet them, and the almost-cured nystagmus shows that the theory I have advocated as to its cause is substantially correct. I am sure that it would be entirely stopped if the lenses were worn continuously and for a long period of time. I shall later report the results as to these experiments.*

I will allude to still another method I have in mind: An attempt to stimulate the pigment-secreting function of the cellular elements themselves, and to supply the pigment matter. This would probably succeed if at all, only in the young with plastic tissues. With this end in view I shall try instillations of a solution of pyoktanin blue in a child's eyes, coupled with delicate massage with the closed lid. The tissues such as the iris and choroid may properly be supposed more responsive to such treatment than those normally non-pigmented. If the experiment do no good it can hardly do harm.

It goes without saying that the acquired ametropia should be corrected. This is a difficult task, but patience and ingenuity will

*My friend, Dr. Risley, tells me he had an albinotic patient with double cataract without nystagmus. It would be interesting to know if nystagmus existed prior to the cataracts.

conquer it. Case VIII was wearing "prescription glasses," simple sph. +2.50 D., in each eye when he came to me. There is a world of significance to this boy in the fact that he is now wearing

R. + sph. 5.00 D., ⊂ + Cyl. 2.00 D. ax. 100°.

L. + sph. 5.50 D., ⊂ + Cyl. 1.75 D., ax. 80°.

In my cases a sufficient time has hardly elapsed to give any results of the simple correction of ametropia, but in all cases there has been the most gratifying increase of power to read, study and sew, the glasses being prized as the most precious of valuable things. There has been an equally pleasant reduction of the photophobia in all of these cases except one, in which case it is but little lessened.

I wish that physicians to whom the subject is of interest will kindly send me all the ocular reports in their power of any cases of albinism that may fall under their notice. I would like to learn if the following tentative conclusions are supported or disproved by the experience and observations of others.

1. Albinos are normally and even exaggeratedly healthy in body and mind.

2. There is no discoverable influence of heredity in the cause or transmission of the peculiarity.

3. The sole pathological influence of albinism is upon the eye.

4. The ocular evils, photophobia, nystagmus, ametropia, (especially high degrees of hyperopic astigmatism), and amblyopia, are directly and indirectly caused by the transparency of the iris.

5. The modus operandi of this etiological factor lies:

a. In the brilliant and diffuse illumination of the fundus of the eye by the non-exclusion of the peripheral rays of light by the faulty diaphragm, producing photophobia.

b. The lid and muscular pressure upon the globe resulting from the attempt to exclude the light, produces the refractive anomaly.

c. The effort of the groping eye to localize and definitize the evanescent and indistinct image produces the nystagmus.

d. The amblyopia is a necessary consequence of all these combined factors.

6. Proper correction of the ametropia lessens eye-strain, lessens photophobia, and increases the power of near-range vision.

7. True prophylaxis and cure must look to the pigmentization of the iris, or to the construction of an artificial opaque substitute for naturally faulty irides.

8. The younger any treatment or prophylaxis or treatment is begun the more promising will be the results.

FUNCTIONAL EXOTROPIA.

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EXOTROPIA may be classified according to its cause, thus: First, organic, from destruction of the nucleus or trunk of the third nerve from disease, or of an internal rectus muscle from traumatism.

Second, partly organic, partly functional, as in partial loss of vision of one eye in anisometropia or in injury, and from high myopia, where the long antero-posterior axis of the balls and the proximity of the near point preclude convergence.

Third, functional, depending on no assignable cause other than heredity, and independent of refractive error.

Fourth, secondary, or those depending upon other muscular anomaly or paralysis of accommodation. It is theoretically possible that the long continued use of one of the mydriatics, e. g. atropine, in disease of the cornea, by reason of the close functional and anatomical relationship, might induce exotropia, but this supposition is not supported by my experience.

Classes one and two may be monocular or binocular, according to the extent and character of the organic cause. Classes three and four are always binocular in the sense that *either* eye may diverge.

True functional exotropia may be defined as a loss of the power of convergence without assignable cause, where the vision of both eyes is alike or nearly alike. This definition excludes the divergence of high myopia, which, while functional, has its cause in the increased length of the balls. It is a passive rather than an active condition; a loss of power rather than a gain of strength. It is a want of equilibrium between the internal and external recti-muscles; a relative increase of abduction or a relative decrease of abduction or an insufficiency of convergence. Insufficiency of the interni is manifestly an inaccurate expression since that term would indicate a loss of power of either or both interni, which is not the case. The conjugate lateral movements are intact and each cornea may be rotated inwards to the normal extent.

In equilibrium, abduction and adduction are equal in range and power. The range of divergence begins at the nearest point of convergence and extends 7° or 8° beyond parallelism and the range of convergence begins at the latter limit and extends to the former. At a point about 80 c. m. from the middle of the basic line, abduction and adduction are exercised in equal degree.

In heterophoria, the diagnosis is not complete without a prismatic estimation of abduction, adduction and sursumoduction, repeatedly made and as nearly as possible under exactly similar circumstances. It must be remembered that the power of the recti to overcome prisms increases with exercise, that adduction is strongest and abduction weakest, at 6 M., that a higher strength will be determined if the prisms are increased a degree at a time than if the gradations are less gradual, and that ametropia should be corrected.

In heterotropia, whether diplopia be conscious or unconscious, ab-,ad,-or sursum-duction cannot be measured by prisms, since the very essence of this method of testing lies in the power of fusion or of binocular fixation. The lateral and median movements of the cornea as the eyes follow an object appropriately moved, must be observed In some cases a slight superiority of vision, or habit, or congenital tendency, will be the determining factor in the eye unconsciously chosen for fixation. In other cases, either is used indifferently and interchangeably. Simply covering the fixing eye will stimulate the other to change the direction of its axis in order to fix and hold the object at all distances and the other will diverge. In such cases there must be a loss of parallelism at all times but a divergence of one axis only.

Functional, uncomplicated exotropia (class 4), is, in the majority of cases, simply a loss of convergence with no limitation of the power of rotating each cornea separately inward. It is, in effect, an association paralysis, or as Alfred Graefe calls it, "a disjunction of co-ordination," and reasoning on physiological grounds, convergence must be governed by a center analogous, probably both in location and function to the centers for elevation, depression and lateral movements. Fuchs,[1] in speaking of the location of the lesion in ocular paralysis, says: "Lesion of the association centers cause conjugate paralysis. The eyes cannot be turned toward an indicated side or can not be brought to convergence. Not infrequently the eyes are drawn to the opposite side through cramp of the antagonistic muscles .... conjugate paralyses, with or without deviation to the opposite side are found in disease of the crura

[1]Lehrbuch der Augenheil-kunde S. 635.

cerebelli adpontem, the corpora quadragemini and the thalami optici."

[2]Herter says: "Conjugate deviation occurs most often as an accompaniment of hemiplegia, whatever may be its cause, and may occur when the lesion is in the cortex (probably the posterior part of the second frontal convolution), in the subcortical white substance, in the internal capsule, or in the pons."

Alfred Graefe[3] speaks of compensory or associated paralysis of the muscles which turn the eyes to the right and left, upward and downward, but omits any mention of paralysis of convergence. He argues that such association paralyses indicate the existence of individual centers for various binocular movements.

Swanzy,[4] in speaking of cerebral paralysis of orbital muscles, says: "These paralyses are always physiological, associated, or conjugate as they are variously and with equal correctness termed, they are, in short, paralysis of motion rather than of muscles.

"Conjugate lateral paralysis—loss of power of motion of the eyes to one side or to the other, while the power of convergence of the optic axis is retained—is by far the most common form of this symptom."

[5]Max Knies, in his latest work, says: "The so-called paralysis of convergence and other conjugate paralyses may arise from peri- and inter-nuclear disturbances, without degeneration of the nerves or muscles."

A summary of our present knowledge of paralysis of convergence without motor oculi paralysis has been recorded by the late [6]Dr. John Joy Jeffries, in a condensed but logical and exhaustive article on eye paralysis, from which I make the following somewhat lengthy extract:

"A good many cases of paralysis of near vision have been reported but unfortunately, as yet, there are no autopsies, (cases by Barel, Earles, Parinau, Peters, Stolting, Graefe, Pilz, DeWattville and Binsler). Some of the cases are suggestive of an hysterical state, but the mass of them point to gross disease. A center of convergence has been assumed to exist in the anterior part of the third nuclei, but as yet nothing definite has been shown. Hensen and Boelker's experiments—which do not tally with others—at the

[2]Diseases of the Nervous System.

[3]Graefe and Saemisch Handbuch.

[4]Disease of the Eye 4th ed.

[5]The Relation of the Visual Organ and Its Diseases to the Other Diseases of the Body and Its Organs.

[6]Boston Medical and Surgical Journal, October 20th and 27th, 1892.

most, do not demonstrate a center: irritation at a point of crossing of fibers would produce the same effect. Thus, if, as suggested above, the fibers governing convergence come down to near the sixth nucleus, ascend and cross to their nuclei, stimulation at this crossing would produce convergence. Whatever the mechanism, this paralysis is just the obverse of lateral conjugate paralysis. With both eyes open, neither will turn in but cover one, and the other comes in at once, while the covered one turns out to a parallel position. The case reported by Binsler may be taken as a typical example. A band man, previously well, ran to an appointment, and, while blowing on the horn, suddenly lost sight of the music and had to stop playing. Careful examination showed that distant vision was good, but near vision poor and accompanied by crossed diplopia. When one eye was covered, the other turned in well for near vision, the covered eye turning out at the same time. The R pupil reacted to light but did not to accommodation. No other symptoms, no change in six months."

The above extracts demonstrate, as far as clinical cases, without autopsies, can, the existence of an independent center for convergence, and that it may become paralysed in gross lesions of the brain. The importance of discriminating between these organic palsies and the purely functional loss of convergence, (class 3), is manifest, and in all cases of heteronymous diplopia, without paralysis, the possibility of a central cause should be considered. It must be admitted, however, that we have classed cases as purely functional only because we are not able to assign a cause, and that the existence of an organic lesion has not been disproved, and that the loss of convergence, as well as our frequent failure to cure, by the means that have proven successful in other deviations of non-organic nature, may be owing to a lesion involving only the center for convergence and giving rise to no other paralysis.

The following cases are illustrations of so-called functional exotropia—Class 3, Case 1. M. F., aged 30. Has had external squint as long as he can remember. Emmetropia, V. R. $\frac{8}{750}$, L. $\frac{8}{8}$, makes no complaint of pain, headache or diplopia. After considerable hesitation, he admits crossed double images 1 M. apart on the same horizontal plane, when the rays from the candle flame at 6 M. are colored by dark red and blue discs. Fixes with L. or R., but prefers the former. Complete tenotomy of each external rectus. Homonymous diplopia for three weeks gradually growing less until the images fused. Binocular fixation for one or two weeks and finally a return to the old condition of exotropia. No permanent improvement from the operation.

CASE II.—Dr. S., aged 29. Exotropia 10° far, 30° near. Vertical equilibrium. His refraction under duboisia is

R. + .50 + 1.25 c ax.; $97\frac{1}{2}° = \frac{8}{8}$.
L. + 1.50 c ax. $82\frac{1}{2}° = \frac{8}{8}$.

Until three months ago he was a victim of the cocaine habit, absorbing, daily, through the conjunctional sacs and the nostrils large quantities of strong solutions of the drug. This habit, he declares, was not the cause of his external squint since the latter antedated, by many years, the former. The nearly constant diminution of the range of accommodation, combined with the substitution of an artificial stimulation for the natural vigor and strength derived from proper food and sleep, and conversely, the loss of stimulation from abrupt and total cessation of the habit, must, however, have had a baneful influence. Tenotomy of each external rectus, done at different sittings, was followed by exotropia and homonymous images. The convergence was lost in a few days, and now, although Dr. S. has binocular fixation, he maintains single vision with conscious effort, exophoria is constantly and exotropia momentarily present. No marked improvement followed the operations.

CASE III.—Etta S., aged 10. Under dubosia R. + 1 = $\frac{8}{8}$ L. + 1 = $\frac{8}{8}$. Marked exotropia. Fixes with either eye indifferently. Images fused at 6 M. by prism 20° base in. Complains of double vision. Double extensive tenotomy of the externi was immediately followed by esotropia of 18°. Final result unknown. The only assignable cause in this case is hereditary transmission, traced through the great grandfather, great aunt, grandfather and father. The father presents an exactly similar muscular anomaly, the same refraction, and full vision in each eye. He prefers to fix with the right.

CASE IV.—Willie T., aged 3. Refraction estimated by retinoscopy—2.D. Wide divergence, fixes with L. more than R. Complete division of each external rectus. One year later the improvement noted some months after the operation had disappeared and the old condition returned.

A tendency to deviate and a deviation outwards—exophoria and exotropia—may be found to exist at different times and under different conditions of physical vigor in the same patient. Exophoria at 6 M. and exotropia at 33 c. m. are not uncommon, or after several hours of close work a latent becomes a manifest deviation. Hence an estimation of the full tendency to deviate can be better made in the afternoon, after a day's work, than in the morning,

after a night's rest. Such cases can not properly be classified either as "phoria" or "tropia," but are probably in the transition stage and will eventually come into a condition of constant "tropia." By using discs of different colors, such as dark blue and dark red, it is often possible to bring out the evidence of a marked muscular trouble that is not revealed by other tests. The effort at fusion is so strong, that, even if overcome in one direction, *e, g.*, the horizontal, by prisms, it is maintained in the vertical. Hence, the phorometer, through which two *similar* images of one object are seen, can not always be depended upon to invariably show the degree or even the kind of heterophoria. But if the patient becomes conscious of two very different retinal impressions of the same object, the effort for fusion readily gives way, and a positive diagnosis, unmodified by the induction of artificial diplopia, both of degree and kind, can be made.

The treatment of functional exotropia has been less satisfactory in my experience than the treatment of functional hyper-or esotropia. Prisms, constantly worn, are of no service whatever, and often a decided disadvantage, since, 1st, they are only a device to fuse double images and not to cure; 2nd, the strength must necessarily be so great that they would be unsightly and a burden, and, 3rd, the degree must increase for every considerable distance inside of infinity.

If the source of the trouble is central, a positive lesion or a negative hereditary or acquired inactivity of a few cells governing convergence, that method of treatment which is based on tenotomies is wrong in principle, since we are weakening instead of strengthening, destroying, instead of building up.

Exercise by prisms, and tincture of nux vomica and strychnia in increasing doses, useful in some cases of exophoria, are equally unavailing.

If advancement of the internal recti were a more successful procedure than it has proven in my hands, I would adopt it, since the method is more logical than tenotomy, but it has almost uniformly failed to produce a lasting effect. The most satisfactory results are obtained from a combination of tenotomy of the externi with advancement of the interni, with the object of securing, immediately after the operation and retaining for a considerable time, decided convergent squint. The degree desired, according to the modern method of operating, can in most cases be obtained, but it is quite impossible to state how many degrees of overcorrection should be sought for, since we are dealing with unknown quantities—an

active divergence and passive convergence, in fact, with a loss of function amounting practically to a paralysis.

A constitutional cause which will satisfactorily explain the loss of convergence under consideration has not hitherto been found, and we must fall back on that indefinite thing—inherited predisposition. Rheumatism, scrofula, kidney disease and phthisis can be excluded.

An analysis of the cases submitted, as well as others of the same class, warrant the conclusions that functional exotropia (Class 3) is independent of refractive error, of other muscular anomaly, of, and not associated with, paralysis of other muscles or functions, that it may be hereditary, that it is difficult to cure and impossible to explain, except on the assumption of a permanent or transient paralysis of the center for convergence, and, if this be the correct explanation, no better results can be expected from tenotomies than in central paralysis of other ocular muscles.

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TUMORS OF THE AURICLE.

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UNDER this heading there are usually described in the text books of otology the following diseases, viz., perichrondritis, auriculæ, othæmatoma, cystic tumor, atheroma, fibroma, especially originating in the lobule, myxofibroma, angioma, aneurismal dilatation of arteries, malignant growths including sarcoma and fibro-sarcoma, and more especially epithelioma.

Deposition of the urates in the auricle occurs in gouty subjects, and partial calcification and ossification have also been described in some books. Chancre and gummy tumors on the auricle have been reported, and among the less frequent growths that occasionally occur may be mentioned enchondroma, having its origin from the cartilaginous portion of the external auditory canal, cylindroma or myxoma cartilagineum originating in the cartilaginous meatus; also lipoma of the auricle, and warts attached to the auricle or cartilaginous meatus.

Among the earlier writers, the terms perichondritis auriculæ and hæmatoma were frequently used to describe the same disease.

Perichondritis auriculæ is a term, however, that alone should be applied to an acute inflammation of the perichondrium, giving rise to a swelling which is usually hot and painful to the touch, of a darkish red color and varying much in size in different cases. It is usually situated on the anterior aspect of the auricle. The swelling is apt to close the external meatus and thus interfere seriously with the hearing on that side.

If an incision be made in one of these tumors, the cavity of the same will be found filled with a thick yellowish fluid, less frequently with pus, and only occasionally with a few red blood corpuscles. The perichondrium becomes detached from the cartilage and the latter and the surrounding parts are greatly inflamed, leading subsequently to more or less thickening and disfigurement of the auricle. If an incision be made in the tumor and a probe introduced, the cartilage will be found denuded and roughened. The

inflammation may have its starting point in the external meatus, and usually involves the concha and fossa helicis, but does not extend to the lobule.

Perichondritis is distinguished from hæmatoma by its more severe inflammatory symptoms, its gradual development and by the contents of the swelling being either of a clear thick fluid or of pus, while in othæmatoma, we always have blood at first. In the later stages, however, it is difficult to discriminate between the two, as an othæmatoma may also contain a syrupy clear fluid or pus and no blood.

After discharge of the fluid contents, recovery may take place with little or no deformity of the auricle, but this is not the usual result, there being generally considerable deformity. The duration of the disease is apt to vary from two to ten weeks.

In the early stage, the treatment should be of an antiphlogistic character, and the tumor should be incised as soon as fluctuation is detected. In opening the tumor and in all subsequent treatment, antiseptic solutions should be used. A pressure bandage and massage will be found beneficial in the after treatment.

Arthur Hartmann (Archives of Otol., Vol. xx, Nos. 2 and 3), under the heading of "Cyst-Formations in the Auricle," describes two cases, in which the tumor in the auricle had developed without manifesting any signs of inflammation. One had existed three weeks at the time of the incision; the other, two weeks. In both, the contents were a clear fluid, not discolored from blood, and without any flocculi. Hartmann considered these as cases of primary cyst-formation, and says: "As for the relation between cyst and perichondritis of the auricle, there is this difference: that inflammatory phenomena are altogether absent in the case of cysts, whilst perichondritis is accompanied with redness, heat and severe pain. The contents of the swelling in perichondritis are frequently similar to those found in cysts, yet they generally have an unclear, purulent character from the admixture of pus corpuscles." Hartmann says: "As first pointed out by Fischer, and confirmed and elaborated by Virchow, Meyer, Pareidt and others, there is found in the aural cartilages, especially of the dyscrasic and insane, as also in the aged, certain changes which predispose to the formation of sanguineous tumors. The shallow cavities pictured by Fischer, of great or small size, situated either in the cartilage or between this and the perichondrium, are regarded by Meyer as the result of hyaline metamorphosis and fibrillary disintegration of the recticulated cartilage, the final stage being the liquefaction and the

formation of the cavity. According to Fischer, the cavities between cartilage and perichondrium originate in the tearing loose of the latter from the former." Fischer attributes the development of these processes which must be considered a predisposing cause of hæmatoma to a chronic inflammation of the cartilage and its covering.

In the same paper Hartmann quotes from Meyer, who examined the cartilages of the ear in thirty cases, and who found extensive formations of cavities, and never failed to discover with the aid of the microscope, distinct signs of softening when the individual had attained the age of 50.

In a collection of cases of younger individuals (from 16 to 50 years of age), Meyer found the large clefts in the cartilage to exist in cases of tuberculosis with large cavities in the lungs; also in cases of free suppuration as in extensive and purulent pericarditis and pleuritis.

Hartmann believes that the "processes described by Fischer, Meyer and others, are not only the predisposing cause of hæmatoma, but are also to be regarded as a preliminary stage of simple cyst-formation. For the development of a cyst, all that is necessary is a more abundant secretion of the fluid; for hæmatoma, the traumatic influence causing injury to the vessels."

Cases of hæmatoma due to injury undoubtedly occur where there are no changes whatever in the cartilage. Knapp (Trans. Amer. Otolog. Sec., Vol iv, part 3), in a paper entitled, "Cysts of the Auricle," does not agree with the views expressed by Hartmann, but considers these cyst-like subperichondrial swellings of the auricle, of which he has seen a number, to be mild cases of perichondritis.

Knapp (Archives of Otol., Vol. xix 45–50), reports a case of ossification of the auricle in consequence of perichondritis seropurulenta. This occurred in the case of a young man, aged 22, who had been troubled with ear disease for seven years. He first noticed two swellings, side by side, on the edge of the ear which did not itch, were quite soft and which were very little if at all red. The two swellings merged into one, and were subsequently lanced and a clear fluid escaped. The discharge keeping up and becoming purulent, it was noticed that the auricle was suddenly becoming hard. When seen by Knapp, the auricle was thickened and contracted. "Most conspicuous was a cylindrical intumescence which extended from the upper anterior part of the pinna transversely backward and then curved down corresponding

to the antihelix, but filling also the fossa of the helix. It felt hard like wood, and could not be bent in any direction. There was a certain rigidity also in other parts of the auricle except in the lobule, which had the ordinary consistence." The portions removed showed that there was real bone substance, compact in some places, cancellous in others, and osteoid at the margins.

T. R. Pooley (N. Y. Med. Record, Feb. 6, '92), reports a "case of perichondritis auriculæ affecting both ears." The patient, female, æt. 22, when first seen was suffering from otitis externa furunculosa of both ears. She was anæmic and poorly nourished. The furuncles were incised, but constantly recurred. The swelling from the canal spread on each side to the auricle, involving its entire extent except the lobule. The swelling invaded both surfaces of the auricle. When last seen, the inflammatory character of the disease had entirely subsided and the pain had disappeared, the general condition of the patient had improved and only the usual deformity remained.

Othæmatoma or hæmatoma auris is a name given to a condition of affairs where there has occurred sudden effusion of blood between the perichondrium and the cartilage. The cause is most frequently traumatism and is usually due to a blow on the ear.

It is a well-known fact that hæmatoma occurs quite often among the insane, and it was formerly supposed in such cases to be occasioned by ill-treatment, but it is more probable that tissue changes in the auricle are the direct cause of a sudden effusion of blood.

Brown-Sequard was able to produce a hemorrhage in the auricle in animals by severing the restiform body.

The swelling when it first occurs, is of a bluish-red color, round in shape. It is somewhat hard and with no distinct point of fluctuation, although in some instances the tumor may feel quite soft. Othæmatoma occurring spontaneously rarely attains a large size. As a rule, it involves the concha and fossa of the helix and antihelix, while in othæmatoma due to otraumatism, the swelling may involve the entire auricle, including both surfaces and occlude the external auditory meatus. In the traumatic variety, there is apt to be great pain, heat and more or less tension.

The resultant deformity depends very much on the extent of the hemorrhage and the injury to the cartilage.

When the latter is but slightly involved, the deformity is not marked, while in other cases, the auricle may be greatly deformed. In some cases reported, there has been considerable destruction of the auricle.

Othæmatoma should not be confounded with perichondritis auriculæ when it is known that the swelling developed suddenly, and may or may not have been caused by a blow.

In the early stage, especially if the othæmatoma be of the traumatic variety and there be much inflammatory reaction, cooling applications, such as the ordinary lead and opium wash, etc., should be applied. When the tumor is of small size and there is but little inflammation accompanying it, the swelling may disappear, but if in spite of local applications and antiphlogistic treatment, the tumor does not decrease in size, it should be opened, the contents allowed to escape, and pressure should be applied. In some cases, it will be necessary to make a large incision, wash the cavity out with autiseptic solutions, and insert a pledget of lint or iodoform gauze, and then apply a pressure bandage. Massage will also be useful in some cases.

The following case of hæmatoma I saw at the N. Y. Eye and Ear Infirmary, Oct. 12th, 1883:

Case I. John D., aged 34 years, said that on September 29th, he was kicked in the head, receiving a severe contusion of the left ear. On the following day, the ear which was swollen was punctured and a little blood let out. He was seen again in the course of a week when the swelling had returned and a small quantity of serous matter had escaped from the puncture. The swelling had been rather painful and was somewhat hot to the touch, and on October 5th it occupied the upper posterior portion of the auricle, was smooth, ovoid in shape, normal in color, fluctuant on pressure. No very great tenderness nor other signs of acute inflammatory action. Pressure was applied with straps, but having become painful, the straps were removed and tinct. iodine was painted on, with orders to the patient to use cold water applications at home. Under this treatment, the swelling subsided somewhat and became harder and less tender; fluctuation only in spots. The patient had some difficulty in hearing owing to partial occlusion of the meatus. On admission to the Infirmary on October 12th, the swelling was punctured with a hypodermic needle and the contents found to be still fluid blood. No pus. There was some induration.

Nov. 9th. Patient has since received another blow upon the ear, and the swelling has returned. He was treated outside the Infirmary, by puncture and the insertion of a drainage tube. There has been no suppuration at any time. To-day a pressure bandage was again applied.

Nov. 13th. The swelling has diminished; color natural; thickening and induration along posterior and anterior margins of upper portion of the auricle. Hearing distance much improved. Aconmeter heard with left ear 15 feet.

Cases of fibromata of the auricle have been reported by Agnew, Burkner, Knapp and others. The disease affects both lobules as a rule, is said to be due to piercing the ears, and is found quite frequently in the case of negro women. A fibroma consists of fibrous connective tissue with an occasional admixture of mucous tissue. It is of a round or globular shape, somewhat movable and of more or less firm consistency. After total removal, the growth is not apt to recur.

The following case of fibromata involving both lobules I saw at the N. Y. Eye and Ear Infirmary, Sept. 22, 1885.

Case II. Evelyn B., aged 17, white, has always been in good health and never had any previous ear trouble. No family history of tumor. Four years ago she had her ears pierced, and directly afterwards, the lobules of both ears began to enlarge and have continued to do so ever since. There has been no pain or tenderness.

From the lobules of each ear depends a rounded tumor, that on the right side being larger, (about the size of a large chestnut) smooth, rounded and pediculated. On the left side, the tumor is irregular in shape and not pediculated.

Tumors soft but firm, not lobulated, homogeneous; not tender to pressure. They apparently send up prolongations into the substance of the lobule. Operation—under ether, I made an elliptical incision surrounding the neck of each tumor, and the latter, with the over-lying skin, was dissected away. The tumors were both removed with capsule entire. The bleeding was slight and but two or three ligatures were required. The wound was closed with silk sutures and coated over with iodoform-collodion.

Sept. 25th. Primary union, no pain, sutures removed. The lines of incision are not seen as they are situated on the inner side of the lobules.

The specimens were examined microscopically by Dr. George C. Freeborn and pronounced fibromata.

Sebaceous tumors quite often develop in the lobule or concha, more frequently in the former. In operating, great care should be taken to remove the sac entire, as otherwise there may be a recurrence of the growth. Where the sac is more or less destroyed by suppuration, the cavity should be well scraped with the curette or sharp spoon.

CASE III. *A case of sebaceous tumor of the lobule, which developed into an abcess:*

Charles S., aged 15, consulted me on account of a purulent discharge from the left ear, which had existed for a year. He said that four days ago, a small boil appeared on the inner surface of the lobule. This has spread and involved almost the entire lobule and the tissues around it are indurated. There is distinct fluctuation. The pus was evacuated and the cavity was found very large. This was treated as an open wound, with a tent of iodoform gauze, and healed entirely in a week's time.

CASE IV. Tumor of the Auricle. Thos. C., aged 8 years, seen April 27, 1888. His mother says that when ten months old he was burned on the left ear and arm and that the growth on his ear has been there for a long time but does not increase in size.

An examination of the auricle showed that a growth, size of an almond and shaped like one, was attached to the posterior border of the helix. It was moveable, not very hard, and unattached to the cartilage. Operation advised but the patient did not return.

CASE V. *Cyst of the Auricle.* Mary McC., aged 50, married, consulted me December 2, 1892, on account of a growth on the auricle. About two months ago she noticed the growth, about the size of a pin's head, and this has gradually increased in size until now the size of a split pea. It is of firm consistence and unattached to the cartilage and situated on the anti-helix. An incision was made across the tumor and the growth easily enucleated with but slight hemorrhage. The wound healed readily with little, if any, trace of a scar. The growth after examination microscopically by Dr. J. E. Weeks, was pronounced to be a "simple cyst with fibrous walls."

63 West 54th Street.

REPORT ON OTOLOGICAL PROGRESS.*

By T. C. Evans, M. D.,

of Louisville, Ky.

To make an intelligent and satisfactory report on the progress of Otology, impartially reviewing the literature of the entire field, giving to each author due credit and to each operation or therapeutic measure its proper place in the scale of importance, discriminating between what is original and what is repetition, without prejudice or favor, and still confining the report within bounds commensurate with the time and patience of a body composed almost wholly of general practitioners, would, indeed, be a difficult task. I shall, therefore, beg leave to confine my report to a single feature of the subject, that of intra-tympanic surgery. This embraces the various operations devised and employed for the relief of impaired hearing, for the relief of tinnitus, and for cure of chronic discharge from the ear, which have resisted treatment by non-surgical means.

During the year valuable and exhaustive articles on this subject have been contributed by Blake, Dench, Jack, Richardson, Randall, Würdemann, and others. Removal of the Stapes. Clarence J. Blake (*Archives of Otology, vol. xxii. No. 1*). Blake advocates the use of cocaine in middle ear operations, in view of the fact that it affords an opportunity for diagnosis by elimination, that it permits the performance of the preliminary incision of the membrana tympani and the subsequent operations including stapedectomy, without general anæsthesia. That in chronic middle ear disease changes seriously impairing the transmission of sound may occur in one part or another of the ossicular chain. The articulations, the fenestral attachment of the stapes, or the membrane of the round window, and escape detection except upon subjection to such direct inspection and tests of hearing power and of the patient's subjective symptoms as an operation upon the middle ear under conditions of consciousness and freedom from pain, would afford. In describing the operation for the removal of the stapes,

*Read before the Kentucky State Medical Society at Frankfort, Ky., May 10, 1893.

Dr. Blake says: "From three to five minutes before the operation, a few drops of a 10-per-cent solution of cocaine are forced into the Eustachian tube through a catheter; the patient is seated erect in a high-backed chair, his head being held firmly by an assistant; with the patient's head erect it is much more easy for the operator to determine the relative position of the parts of the middle ear exposed by the operation and the angle of attachment of the stapes; a very variable one and of importance from an operative point of view, and that the position of the head can be adjusted at command, as the operation proceeds. The incision of the membrana tympani should be made with the paracentesis needle; the cut which I prefer to the one which I have heretofore used for the mobilization of the stapes, and is a modification of that of Miot, but is an incision merely and not an excision of the membrane, and begins at a point midway between the short process and the tip of the long process of the malleus, and close to the manubrium, then extends upward along the posterior ligament of the short process, and follows the periphery to a point posteriorly on a line with the tip of the manubrium, the result being the formation of a flap which falls downward and outward, leaving an unencumbered opening with free access to the subsequent field of operation; bleeding is stilled by a sterilized solution of cocaine; the hearing is tested, if desirable, and, the operation continued. The next step being the division of the tendon of the stapedius by means of a paracentesis needle, or if the stapes is situated forward and in full view, the division first of the incudo-stapedial articulation, which is done with a small triangular knife, a large angular knife being subsequently passed behind the incus to insure separation. An examination of the stapes by means of probe and blunt hook, and a repetition of the hearing test, help to determine at this stage of the proceedings whether the stapes shall be mobilized or extracted. In the latter instance the stapes should be first mobilized and then extracted. The best instrument for this purpose is a slender, blunt hook curved very slightly backward, which is passed behind the head and between the crura from below upward. The resistance offered to the traction hook varies considerably. When the stapes comes away entire, there is a sense of contact resistance followed by a sense of suction. When the crura break, leaving the foot plate in position, the contact resistance alone is felt. At the moment of removal of the stapes, there is a decided change in the character and rate of pulse; vertigo is not necessarily present, but should always be regarded as a contingency. After the operation

the ear should be tightly stopped with sterilized cotton, and the patient kept quiet two or more days."

OPERATIVE MEASURES FOR THE RELIEF OF CHRONIC SUPPURATIVE AND NON-SUPPURATIVE INFLAMMATION OF THE TYMPANUM. THE INDICATION FOR THE EMPLOYMENT OF SUCH MEASURES AND THE RESULTS OBTAINED. E. B. Dench, *New York Eye and Ear Infirmary, reports Vol. 1, part 1*, Dench emphasizes the importance of differentiating between nerve lesions and lesions within the middle ear before an operation is advised. On this point he says: "An ear may have been the seat of a suppurative process as a result of which the membrana tympani may have been almost completely destroyed, and the ossicles bound together. Impaired hearing and tinnitus in such cases might depend upon this condition, or it might depend on nerve lesion. A careful determination of the lesion should be made in every case. A series of tuning forks of different pitch furnishes the means. In determining the advisability of operative interference for the improvement of hearing, application is made of the well-known fact, that in lesions of the conducting mechanism, the normal relation between air and bone conduction is reversed."

In describing his method of operating, Dr. Dench says: "A general anæsthetic is always necessary for the performance of any intra-tympanic operation. Except in division of adhesions where the membrana tympani has been previously destroyed—the ear should be douched with bichloride, 1 to 5000. I always operate with the head and shoulders elevated, supported on a rest which admits of motion in all directions. Straps prevent the patient from sliding down. When the membrana tympani is intact and the incision is made in the posterior superior quadrant, beginning just below the membrana flaccidi, following the course of the insertion of the membrane and of sufficient extent to bring the incudo-stapedial articulation into view. If a single incision does not accomplish this, a horizontal incision may be made from the upper extremity of the first, allowing a triangular flap of drum membrane to be turned down. By cautious manipulation with a fine probe the head of the stapes may usually be brought into view. The tendon of the stapedius should not be divided in the first incision, then the incudo-stapedial articulation will be more plainly seen. Disarticulation is now effected by a triangular knife being passed in front of the long process of the incus with the point directed backward and pressed downward through the articulation, With the fine probe tbe mobility of the stapes is now determined. A

horizontal incision is next made at the lowest point of attachment of the membrana tympani, with a blunt knife the membrane is divided close to the tympanic ring from below upward anteriorly and then posteriorly to just above the short process. That portion of the membrana flaccidi above the short process is next divided by the knife being plunged upward and inward above the short process, dividing the ligaments which hold the malleus and the remains of the membrana tympani. Usually the short process of the malleus can be distinctly seen, and it only remains to grasp it with forceps and pressing first inward and then downward add finally by traction outward, this bone with the attached membrane is removed. The next step is the removal of the incus. The ossicle can usually be brought into view by the incus hook. These hooks are curved in opposite directions for the right and left ears, the long process of the incus seized, and by gentle traction downward and outward easily removed. The stapes, if rigid, should be rendered movable by incisions and pressure. If advisable, the ossicle may be extracted by means of a blunt hook passed between the crura.

After the operation a strip of antiseptic gauze is carried to the bottom of the cavity and the canal tightly packed. This method of operating must be modified where the destruction of the membrana tympani has already taken place. The increased vascularity renders the hemorrhage more profuse, thus hiding the deeper structures from view early in the operation. It is advisable to free the stapes early from the surrounding structures before the vascular parts are divided. My own cases at the hospital include twenty-four of chronic suppurative otitis media. In fourteen the discharge was stopped, in eight much reduced with two recent cases still under treatment. In fourteen the hearing was improved, in nine it remains the same, in one it was apparently reduced. Nine operations have been performed on seven patients in which the membrana tympani was intact. The hearing was greatly improved in four, slightly improved in four, unimproved in one. From what has been shown in the preceding pages, it seems to me that there can be no question that surgical procedures upon the middle ear enables us to benefit a large number of patients who would otherwise be unrelieved."

Remarkable Improvement in Hearing by Removal of the Stapes.—F. L. Jack (*Trans.-American Otological Society, 1892*) advocates the removal of the stapes without the malleus incus and drum membrane, in cases of deafness from non-suppurative catarrh of the middle ear. He says not only is the simple

removal of the stapes much better in its results, but on the grounds of conservative surgery, much to be preferred. It produces the greatest improvement in hearing without inflammatory reaction or bad results. The operation is as follows: "The first step is to make a cut shaped like an inverted 'V' just over the incudo-stapedial joint, allow the flap to fall forward. This give a clear view of the articulation. Next, separate the stapedius muscle from the head of the stapes; this is done by passing a very slender knife behind the head of the bone. This muscle must be completely severed, otherwise when the stapes is loosened the muscle will pull its head out of sight and cause much trouble in its subsequent removal. Having cut the muscle, the articulation with long process of the incus is then severed by passing through the joint from behind forward a small triangular knife. If not perfectly loose it can be made so by passing a small-pointed knife around the head; a small hook now introduced behind the head will with gentle traction remove the stapes. It has seldom been necessary to use cocaine to prevent bleeding. The patients usually remain quiet in bed for two or three days with the ear plugged with cotton.

After reporting in detail sixteen cases, Dr. Jack says "while recnizing the possibility of error in all human calculations, the results obtained in the cases reported are of such a nature as to lead me to be very hopeful of the future of the operation. In general the cases show little tendency to inflammatory reaction. The effect of the operation on the hearing as tested by the watch was not marked in either way; in some cases a slight gain, in others a slight loss. The test with König's rod met with similar results. The one result of this operation which gives it importance, and has led me to make this report, is the very marked improvement in hearing the human voice. If persons who have heretofore heard only with difficulty can be made now to hear with ease, by treatment unattended with danger, the operation is certainly worth considering. As to the reason this effect is accomplished by the operation, I have no theory to offer other than the simple supposition that it is by the removal of mechanical obstruction to the sound waves."

THE OPERATION FOR THE EXCISION OF THE OSSICULA IN CHRONIC AURAL CATARRH, WITH INSTANCE OF A FAILURE. H. V. Würdemann (*Journal of the American Medical Association*, October 22, 1892) said: "Before taking up the subject-matter of my paper, I would like it to be distinctly understood that I intend casting no aspersions upon aural operative procedures. I have had marked success both

previous to and since the one disastrous result, which forms the nucleus of this paper. I can discover but little mention of accidents occuring during or after the operation, and these have all been in supperative cases. I can find in only three instances the admission of but two operators of unfavorable reports upon hearing. I have excised the ossicles in eleven cases, four of these have been for non-suppurative inflammation. In only one instance has suppuration followed. One year ago a strong, healthy man, aged 60, consulted me about his ears. He complained of deafness, noises in the head and vertigo, for which he sought relief. I treated the middle ear of both sides with catheter, using camphor-iodin and camphor-menthol vapor for three weeks with absolutely no improvement of hearing on either side. Despairing of improvement by other means, I suggested an operation. I removed the membrana tympani under anæsthesia. The operation was clean; although several attempts were made to reach the incus, it was not obtained. There was excessive vomiting after recovery; he complained greatly of vertigo. On testing his hearing on the evening of the second day, I was surprised to find he was totally deaf on the operated side. No reaction followed until five days later. He had pain at night, and on the next morning an acute otitis media set up, which ran its course in two weeks." Dr. Würdemann thinks the lesion was due to a hemorrhage into the labyrinth during the ether anæsthesia, or during the excessive vomiting thereafter, with subsequent organization of the clot.

A Case of Operation for Catarrhal Deafness. B. A. Randall (*Trans.-American Otological Society, 1892*), reported a case of excision of the drum membrane and malleus for catarrhal deafness, followed by suppuration, mastoid empyema and burrowing abcess of the neck. There was oculo-motor paresis, diplopia and some mental aberration, suggestive of inter-cranial abscess. A good recovery was ultimately made, but at no time was there any improvement in the hearing. Dr. Randall thinks probably the trouble was caused by the incus being displaced upward, clogging the exit of the antrum and inducing the empyema. The consensus of opinion of a number of competent and conservative operators who have contributed the results of their labors in this field during the past year, is that in the chronic suppurative and non-suppurative diseases of the middle ear, uncomplicated by lesions of the auditory nerve, this procedure is not only justifiable, but advisable. In suppurative cases the discharge is always diminished and generally entirely cured. The hearing is in the majority

of cases markedly improved, especially for the voice. The results on the tinnitus are more variable; in some cases it is entirely relieved, in others apparently unchanged. There is but slight tendency to inflammatory reaction with but little danger of further impairment of the hearing.

Altogether, it seems that intra-tympanic surgery offers with a considerable degree of certainty a reasonable amount of relief to a very large and an exceedingly unfortunate class of cases who have heretofore been considered out of the pale of medical assistance.

419 West Chestnut Street.

THE USE OF GRAFTS OF SKIN AND OF MUCOUS MEMBRANE IN THE TREATMENT OF DISEASES OF THE EYELASHES AND OF THE LIDS.

By H. W. Woodruff, M. D.,

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SINCE the investigations of Thiersch and others in demonstrating the vitality of grafts of skin, his method has become an essential feature in modern surgery, especially in plastic operations about the face.

The oculist is often confronted with deformities of the eyelashes and of the lids, which may be relieved by the judicious use of these grafts.

For pronounced forms of entropion the usual methods of operating as those of Hotz, Arlt and others, generally suffice; but we often have the condition of partial entropion or trichiasis and distichiasis where there is no incurvation of the tarsus; but a failure of the lashes to grow in the proper direction, or the presence of more than one row.

These lashes may, of course, be removed by epilation or by electrolysis, methods which experience has shown are not uniformly successful.

Many use strips of skin, splitting the border of the lid and filling the gap with the graft, and this method generally has the effect of turning out the lid border and removing the offending lashes from the cornea. But skin is not mucous membrane, and never becomes such, and very often a graft of skin will keep up the irritation of the cornea even if no hairs are present, and it is not always possible to obtain a skin graft entirely free from hairs.

In all cases where only a small strip a few millimeters in width is needed, the mucous surface of the lower lip furnishes a good locality for such a graft. The mucous membrane graft, if properly applied, is non-irritating.

The general methods are the same as in all plastic operations.

The essentials to success are the same as in the treatment of any wound.

Absolute asepsis, complete stasis, approximation of the parts, and rest.

In eight cases in which this method was used all were successful; but in two the effect was not sufficient owing to the small size of the grafts.

In securing asepsis the usual methods may be employed, not allowing a stronger solution than 1 to 5,000 of the bichloride of mercury to enter the eye.

The incision is made along the border of the lid; care must be taken to have it behind all the cilia. It must be made deep and of sufficient length. The lid clamp may then be placed on the lip and a strip of mucous membrane, slightly larger in all dimensions than the incision, is excised, taking care not to remove submucous tissue with it. This strip is placed in a warm alkaline solution until all hemorrhage has been checked about the lid.

Continuous washing with the bichloride solution with pressure with a pledget of cotton, will be sufficient. The graft is then accurately approximated, taking care to remove all clots. Lids are carefully closed and both eyes bandaged. It is not necessary nor advisable to use sutures, as with proper care the graft will retain its position. Bandage may be removed in about three days.

I wish to refer to a case of skin transplantation in a man, aged 71. He was admitted to the Illinois Charitable Eye and Ear Infirmary, with an extensive ectropion of the right lower lid, of two years' duration, due to a relaxation of the skin with spasm of the orbicularis muscle. General health of the patient was good. The lid itself was somewhat shrunken and could not be raised to its normal position.

An incision was made parallel with the border of the lid and the upper flap drawn upward. This made a space about thirty millimeters long and about eighteen millimeters wide. The flap was taken from the inner surface of the arm, about six millimeters larger in all dimensions than the space to be filled. After removing all underlying tissue it was placed in a warm boric acid solution until all hemorrhage had ceased. Flap was then placed in position and, where necessary, trimmed with scissors so that it approximated all parts accurately. About six fine sutures were used to hold it in place. A moist bichloride dressing was applied and both eyes closed with a bandage. Bandage was removed on the third day and sutures on the fifth. There was some suppuration on the nasal side of the flap and a dressing of iodoform was used.

In two weeks the bandage was left off and a solution of bichloride of mercury, 1 to 5,000, used as a wash three times a day. Patient was discharged in four weeks from the time of operation. Graft had shrunken somewhat, but there was no return of the ectropion and the conjunctivitis, which had been present before, was entirely cured.

Field Building.

REPORT OF A CASE OF PLASTIC OPERATION FOR THE REPAIR OF THE INNER CANTHUS.

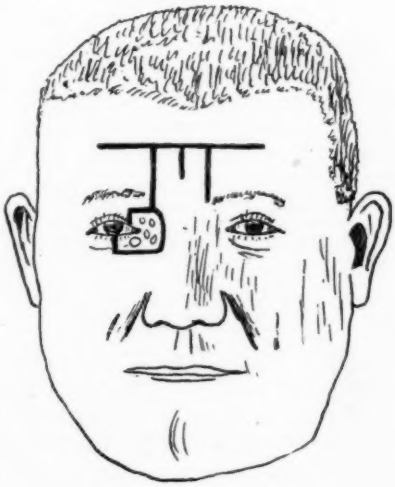
By W. H. Bates, M. D.,

OF NEW YORK.

ASSISTANT SURGEON TO NEW YORK EYE AND EAR INFIRMARY.

THE case is interesting because of some new features in the operation. It emphasizes the well-known fact that a flap with a pedicle does not shrink.

September 26, 1889. Mr. C., aged 50, presented himself at the New York Eye Infirmary, service of Dr. R. H. Derby. Six months ago he noticed a pimple at the inner margin of the right upper lid. The pimple discharged some pus and has increased in size. At present he has an epithelioma involving the inner canthus, part of the nasal side of the upper and lower lid and extending a quarter of an inch over the side of the nose. Trachoma, both eyes, third stage. Epiphora.



(Fig. 1.)

October 1. Operation. (See Fig. 1). The involved skin of the nose and one-eighth of an inch beyond was removed. The inner third of the upper lid and one-half of the lower lid were removed, including skin, cartilage and conjunctiva. The underlying bone was scraped very thoroughly with a sharp spoon. Hemorrhage severe, controlled by hot water,

The second step in the operation was the preparation of the flap. A horizontal incision was made through the skin of the forehead near the beginning of the hair, the incision being more than three inches long. Two parallel vertical incisions more than an inch apart extended downward from the horizontal incision; the right being continuous with the edge of the wound, the left stopping at the bridge of the nose.

The flap outlined in the center of the forehead was separated from the underlying muscle. There was not much subcutaneous fat. After being dissected off the forehead, the flap was turned down out of the way.

The third step in the operation: The skin of the forehead below the horizontal incision was thoroughly undermined far back on the side of the head so that the cavity left after removal of the flap was covered by sliding the skin of the forehead to the median line. The skin was approximated without much traction. A number of hare-lip pins were used to prevent sutures cutting through. Silk sutures used to unite the cut edges.

The fourth step in the operation: The upper border of the flap was split by an incision almost an inch long in the center of the flap. The right divided end of the flap was fitted to replace the lower lid, the left end of the flap the upper lid. The flap was much too large and required considerable trimming. No attempt was made to approximate the under surface of the flap to the margin of the orbit. A pledget of cotton was inserted at the inner corner of the eye to keep the palpebral opening from narrowing by adhesion of the split flap. Bichloride wet dressing. Time of operation two and one-half hours.

I am indebted to Drs. Hunter, Price, Adams, Gibson and others, for valuable suggestions during the operation.

The patient was in bed a week. Dressing changed on third day. Sutures removed ten days after the operation. Healing by first intention on the lines of the sutures. Flap adherent to the bone in about five weeks.

October 24. Discharged from the hospital.

(FIG. 2).

From a photograph, May, 1891, nineteen months after the operation. The portion of the flap which replaced the nasal side of the lower lid has remained in place, while there is an entropion of the outer portion of the original lid caused by the trachoma. The portion of the flap which replaced the nasal side of the upper lid has been drawn inward; this took place when the flap over the side of the nose became adapted to the bone. The lid flaps support the eyeball and are held in place by the portion of the lids which was not removed. The inner surface of the lid flaps looks as if covered with conjunctiva which it is not; it is continuous with the conjunctiva of the lids and globe with no apparent line of demarcation. It is well to emphasize this fact because many who saw the case after the operation could hardly believe that the under surface of the skin of the forehead could granulate and resemble conjunctiva.

The free margin of the skin of the flap has formed a margin of the lid which has the appearance of a lid margin except that there are no eyelashes.

The inner corner of the eye is rounded instead of being angular. This occurred, and the palpebral opening was narrowed because the parts of the split flap were not kept properly separated a sufficient length of time after the operation.

Patient is able to close his eye except at the inner corner. The globe is freely movable in all directions.

No epiphora. The opening into the tear passage of the nose was allowed to heal over and it was expected that an opening would have to be made later to allow the tears to find their way down into the nose. Patient does not need such an operation.

The incurving eyelashes of the lower lid pressing against the globe do not annoy the patient. There is less photophobia of the operated eye than of the other. The photograph shows the operated eye closed more than the left—due to the strong light, ordinarily the right eye is more open, has less pannus and feels more comfortable than the other.

The photograph does not show a horizontal scar extending from the inner canthus. There is also more wrinkling over the base of the nose than the photograph shows. The transplanted flap is as movable over the bone as the original skin.

No return of the epithelioma after more than two years.

131 West Fifty-Sixth Street.

THE TOXIC AMBLYOPIAS; THEIR SYMPTOMS, VARIETIES, PATHOLOGY AND TREATMENT.

By Casey A. Wood, C. M., M. D.,

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(*Continued from Vol. 1, Page 258.*)

Predisposing Causes, Symptoms, Diagnosis and Prognosis. Tobacco, Alcohol and Alcohol-Tobacco.

WHILE we must regard the toxic agent as the direct or exciting cause of the visual failure, it must not be forgotten that there is a number of well recognized indirect or predisposing causes which favor the development of the disease. These we shall proceed to consider.

Idiosyncrasy. In almost all instances of impaired vision where the exciting of cause the amblyopia is a drug in common use, whether as a medical remedy or not, there exists an idiosyncrasy on the part of the sufferer against the agent in question. This also holds true, but to a less degree, in those cases where the poisonous agent is infrequently employed. How comparatively few persons suffer from impaired vision due to alcohol, tea, chloral or tobacco, and yet how universally are these agents employed. Nor is there any necessary relation between the amount of the poison absorbed and the amblyopia. Frequently one finds that the eyesight entirely escapes in persons living most of the time on the borderland of insanity from drink or who are continually reeking with the stale odor of chewed and smoked tobacco. On the other hand, a well marked amblyopia may be met with in persons smoking a couple of ounces of mild tobacco or two or three cigars a week. The exceptions to this rule are such drugs as the mydriatic poisons—belladonna, hyoscyamus, and the like—which when taken in full doses almost invariably produce a temporary amblyopia.

Age. One rarely sees a case of tobacco, tobacco-alcohol or alcohol amblyopia in a patient under forty, notwithstanding the free

use of these stimulants by persons under that age. The *vis resistentiae* of youth protects the nervous system from the degeneration which in old and middle-aged persons results as well from these as well as from other causes. In Uhthoff's cases the alcohol and tobacco amblyopics were of the following ages:

28-30	years	of	age	4
30-40	"	"	"	30
40-50	"	"	"	46
30-60	"	"	"	39
60-70	"	"	"	18

According to T. des Planches lead amblyopia occurs most frequently between the ages of thirty and forty.

Sex. The male sex has a practical monopoly of amblyopic symptoms from these toxic agents. In Uhthoff's 135 cases every one were men. An exception to this rule is found in the case of lead amblyopia. Oliver (*61) feels certain that women exhibit a greater susceptibility to lead poisoning than men. Of 135 cases noted by him in the Newcastle infirmary 91 were women and 44 men. In my opinion the influence of sex is, *per se*, very slight in the production of amblyopic symptoms from toxic agents. If women were to use intoxicants or were exposed to the influence of toxic agents to the same extent as men, visual disturbances would be as common from that cause with them as they are with the sterner sex. Of the cases of quinine amblyopia reported to date (about 60) nearly one-half are females. The meaning of this is that the drug is used almost as extensively by women as by men. I am also inclined to believe that if strict inquiry were made slight disturbances of vision from toxic agents would be found to be more common among women than they are generally thought to be. Chisholm (*62) relates an interesting case of tobacco amblyopia in a refined lady which emphasizes this assertion. The following history is a further illustration of this contention:

Amelia F., aet. 56, presented herself at the clinic of the Post-Graduate Medical School desiring presbyopic glasses. She gave the usual history of failing vision for near work and said that no glasses seemed to help her. She also stated that her distant vision had been "misty" for some time past. To drown domestic sorrows she drinks a pint of whiskey before breakfast and smokes 6 to 10 pipes of "Tip-top" tobacco daily; has typical central scotomata for red and green. Pupils contract well to light and acc. No fundus changes. VR and L = 6-60; with plus 1. D = 6-18. Can read Jaeger VI with near correction. Promised to give up alcohol and tobacco, but has not since returned.

Occupation has something to do with the liability to toxic amblyopia from tobacco and alcohol. As Berry points out, in the

case of workmen, farm laborers and others who rise very early and work a few hours before breakfast the temptation to smoke and drink on an empty stomach is great. This is also true of bartenders and saloon keepers, who, in the course of business, feel obliged to consume at all hours numerous samples of their own wares.

The action of all forms of exhausting disease—especially those that affect the nutrition of the body—in predisposing to the toxic action of nicotine and alcohol is too well known to need discussion here. They act just as poor and insufficient food does and for the same reasons.

Symptoms.—Attempts have often been made to separate the signs and symptoms of tobacco amblyopia from those due to alcohol alone or to alcohol and tobacco combined. Poetscka, Foster and Hirschberg (*63) assert that such a differentation can be made. These contentions will be afterwards considered under another heading, but since, in my opinion, there are no reliable signs or symptoms whereby nicotine amblyopia can be distinguished from that due to alcohol, the symptomology of the three forms of amblyopia will be considered under one heading.

Symptoms.—The first symptom of which the patient usually complains is dim or "misty" vision. It is not to him so much a failure of sight as the sensation of looking through smoke or mist at distant objects. The visual failure grows gradually worse; it almost invariably affects both eyes and to the same extent. Monocular amblyopia from toxic agents is exceedingly rare, although Lawford and others have recorded such cases. The noticeable thing about the failure of vision from these intoxicants is that it never becomes absolute. One may state with certainty that complete loss of sight never happens in pure alcohol or tobacco amblyopia. In the Uhthoff cases (135) it never sank below $\frac{6}{200}$.

Pseudo-presbyopia.—I have also noticed that an early indication of trouble is the inquiry for stronger glasses with which to do near work. The sufferer finds, for example, that it is impossible for him to read as well as he previously did, even before he notices any marked defect in his distant vision, and naturally concludes that he requires a change of spectacles. And, for a time at least, strong convex lenses may assist his failing vision by producing larger images, especially if they are very strong and the print is held near the eye. As the disease progresses he discovers that he can not read ordinary print with any glasses; indeed with the best glasses he may be able to read only Jaeger 6 or 8.

The amblyope rarely suspects the cause of his trouble, as he has probably not made any recent change in his habits, *i. e.* drinks about the same amount of alcohol and smokes the same number of cigars or the same quantity of tobacco. The worry and anxiety attendant upon his impaired vision may indeed induce him to smoke or drink the more, but as that occurs after the amblyopia has declared itself, he does not think of the circumstance as likely to increase his troubles.

Color Blindness.—This symptom is a very common one and is confined, as a rule, to inability to distinguish green and red. The sufferer may not find it out until he has handed over a five-dollar gold piece or a two-cent piece for a nickel, or (in England) given a sovereign for a sixpence. An amblyopic patient of mine, with fair visual acuity, used to complain that he was no longer able to delight his eyes with the sight of certain scarlet berry clusters on the mountain-ash trees near his home. Connor (*64) relates the case of a florist who found himself mistaking colors in making decorations with plants. The color of his red roses became dirty and he could no longer see to pick the worms off the bushes. Noyes (*65) speaks of an artist who complained that he was not able to produce upon canvas the brilliant reds that he once did.

This color defect is confined to the center of the field of vision. It is a negative scotoma so that the patient is not conscious of the defect as such. A red surface to him is all red.

Variable Vision.—Not infrequently these amblyopic patients see better in dim than in bright light. One of my patients complained most bitterly of a shimmering before his eyes like "heat rays rising from the ground in summer."

Most observers speak of a patient's better vision towards evening, but I am inclined to believe that this is especially true of the early morning hours when the patient has been refreshed by a good night's rest and the light is not strong enough to contract the pupils. A patient of mine, suffering from tobacco-alcohol amblyopia (with vision of $\frac{6}{60}$), was obliged to arise before dawn. He told me, without suggestion on my part, that he could see remarkably well when he first got up, that his sight became obscured as the day advanced and then it partially recovered towards evening. Since toxic amblyopes see better with the perimacular parts of the retina than with the insensitive yellow spot, it is easy to understand that a dilated pupil will be of some advantage to them. The occasional use of very weak (gr. one-eighth to one ounce)

atropine drops, as well as the wearing of tinted glasses, subserve the same purpose; the former keep the pupil in a state of dilatation by paralyzing the contractor fibers of the iris, while the latter gain the same result by cutting off the bright rays of the sun.

Signs.—The use of the ophthalmoscope sometimes reveals certain changes in the optic nerve and sometimes the disc is absolutely normal. In the latter case we may suspect from what we know of the morbid anatomy of the disease that the atrophic changes have not advanced as far forward as the disc. The most constant sign is an abnormal pallor (sometimes exactly triangular in shape, singling out the macular bundles) of the temporal side of the papilla. Uhthoff (*66) observed this in sixty-three out of one hundred cases of central toxic amblyopia. In eight the neighboring retina was affected without decoloration of the disc, while the fundus was normal in twenty-eight cases.

In a patient suffering from alcohol-tobacco amblyopia, which I had an opportunity of observing in Mr. Lang's klinik at Moorfields, there was on the temporal side of the disc a well-marked atrophic crescent extending quite to the edge of the papilla, and resembling in form the extra-papillary crescent of myopia.

Alcoholic Retinitis has been observed in a few instances. Edmunds and Lawford (*67) relate the following case: A man, æt. 49, suffering from alcoholic paralysis, but without complaint of defective sight, relative scotomata, diabetes, albuminuria or history of syphilis, was found during life to present most of the appearances of syphilitic retinitis. Death in six months. Microscopical examination showed widespread disease of the retina with absolutely no affection of the optic nerve bundles or of the trebeculæ. No œdema or infiltration in nerve sheath. E. and L. quote Sharkey's (*68) case as the only other one where retinitis, due to chronic alcoholism, has been reported. They think the disease should be termed alcoholic retinitis, and the fundi of all chronic alcoholics should be observed for retinal changes. In this connection it might be noted that Uhthoff (*66) distinctly refers to alterations in the retina as examined ophthalmoscopically in a thousand cases of chronic alcoholism examined by him. The appearances were those of a very slight neuro-retinitis, but without retinal hæmorrhages, papillary swelling, etc.

Loss of pupillary reflex to light was noticed in one per cent of Uhthoff's cases, and has also been remarked by others and shown to be due to one or other of these toxic causes alone.

Optic Atrophy.—It is at least questionable whether these toxic agents are capable of producing atrophy of the optic nerve, although such a claim has been made by various observers. It is highly probable, however, that where a central amblyopia of toxic origin goes on to true atrophy of the nervous tissue the latter condition is an association merely and not a later stage of the former. A fair example of such a case is published by Hinde (*69), of Chicago. See also an admirable paper by Groenouw (*70). There were of Uhthoff's 1,000 patients only two doubtful cases with absolute central scotomata and peripheral limitation of the field.

Lawford (*71) relates nine cases which were diagnosed by him as tobacco amblyopia, but later on he found that either they did not get well under treatment or got worse. It may be remarked in this connection that Nos. 3, 6 and 7 are certainly typical cases of tobacco amblyopia, and it seems impossible that they could be otherwise; but in Nos. 1, 2, 4, 5 and 9 the peripheral F. of V. was contracted and the scotomata were unusually large, while in No. 7 nothing was said about the periphery of the visual field.

Much has been written about the relations existing between the optic atrophy associated with *diabetes* and that produced by toxic agents, and it has sometimes been claimed that the former is sometimes a later stage of the latter. In my opinion this has never been proved. From all that we know of both processes it would seem as if the glycosuria did sometimes predispose to toxic amblyopia, but true destruction of the nerve is the work of the diabetes alone.

Lippincott (*72) has published an interesting case where, after an attack of delirium tremens atrophy of both nerves with deterioration of central vision, concentric limitation of the F. of V. and incomplete color perception were present. Later, complete recovery.

Relative Scotomata.—Central color scotomata form an almost invariable sign of the diseases belonging to Class I. In uncomplicated cases of tobacco and alcoholic amblyopia the colors affected are red and green; blue and white are probably not entirely affected. Quite otherwise is it with carbon bisulphide where an absolute scotoma for white may occur.

The typical scotoma for red in the former instance is that of a small oval including the fixation point and extending almost or quite to the blind spot. Much difference of opinion exists both as to the shape assumed by these scotomata and as to the conclusions

to be drawn from it. Pœtschka, Hirschberg and others, affirm that when the amblyopia is due to tobacco alone, the relative defect has a paracentral position, while that due to alcohol is more or less pericentral. Uhthoff, having this contention in view, found that in eleven cases of well-marked pericentral scotoma alcohol was the cause of the disease in seven cases, tobacco in one case and tobacco-alcohol in three cases. Of nine cases of paracentral scotomata he found two to be due to tobacco, three to alcohol and four mixed. In one case ($V=\frac{15}{200}$) the scotoma was sometimes pericentral, sometimes paracentral, and Uhthoff hence concludes, truly I think. that when the patient continued to fix the central spot with his fovea, a pericentral scotoma was pictured, but when he chose an extra macular portion of his retina for the purpose it was paracentral. If this be true, very little reliance can be placed upon the shape or relative position of these scotomata so far as the diagnosis between tobacco and alcohol is concerned.

Disease of the macular region may sometimes be mistaken for central toxic amblyopia, as the following case will show: C. T. H., æt. 40, has always been healthy, but for twenty years has been a hard smoker and lately consumed as much as a pound a month of "Lone Jack," (a medium tobacco), with a daily use of five or ten cigars a day. Limited use of alcohol. In April '90 had an attack of the grippe, from which he laid in bed for six weeks and was confined to the house for nearly three months. Ten days after the attack began he noticed that he was blind, and for sometime could not see the bowl of his pipe while smoking. Then he got gradually better and as his strength returned, vision improved. When he got well enough to go out he could see large objects; could, for instance, distinguish men from women, but nothing more. There was additional improvement until August last. On December 6th, $VR=\frac{20}{50}$; $VL=\frac{20}{100}$. At this stage his case was diagnosed as one of A-T amblyopia, and his smoking and drinking were stopped. He was given hypodermic injections of strychnia every morning until he was taking one-third of a grain. I then had an opportunity of examining him and found in the RE a central scotoma for red, green, blue and yellow. White was seen as gray. There was the same condition in the left eye, the colors being clearer five degrees from the center and especially on the nasal side of the field. He had been using the strychnia for a month, but careful examination showed that there had been no improvement in vision. With + 1. LE. J iv; RE. J II, both very deliberately. A fundus examination revealed a whitish discoloration

about the fovea centralis of both eyes and although the treatment with strychnia and abstinence from stimulants was kept up for another six weeks, no improvement in either distance or near vision occurred. A year afterwards the condition of the patient was unchanged. I regard this case as one of double macular hemorrhage.

Powers' Test.—If a toxic amblyope be made to inhale a few drops of amyl nitrite and his vision be examined as soon as flushing of the face sets in, a temporary increase of visual acuity will be observed. This amounts upon occasions to as much as a rise from $\frac{20}{200}$ to $\frac{20}{50}$ or $\frac{20}{40}$ and alone forms the most positive proof that the patient suffers from an affection whose visual defect is due to an anæmic state of the optic nerve. Moreover, this affords a test of some prognostic value for it has been noticed that in those cases where the visual increase is marked that a cure can be safely predicted in the near future. In one case (VR=$\frac{20}{100}$, VL=$\frac{20}{200}$), under my care the effect of amyl nitrite was so lasting and gave so much relief that I administered the drug at regular intervals in addition to other remedies.

Contracted Pupil.—It has been shown both by Schur (*73) and Rogow (*74) that the local application of nicotine acts like eserine in producing miosis, that is to say a paralysis of the sympathetic nerve endings of the iris which allow the *sphincter pupillæ* fibres to act. This fact probably explains the contracted pupil so common in tobacco and tobacco-alcohol amblyopia. The blood and other nutrient fluids continually charged with nicotine, in quite the same way, exerts a specific but quite local action. This is the opinion of Hirschler (75), who, however, attributes the contracted pupil, which he has noticed in pure alcohol amblyopes, to disease, (probably fatty metamorphosis) of the medulla oblongata.

When all the symptoms of central amblyopia, due to intoxicants are considered, it ought to be, and as a matter of fact is, easy to detect and differentiate these forms of ocular disease. Uhthoff, (66), thus summarizes the points of *diagnosis between the retrobulbar neuritis of tobacco and alcohol and that due to other causes* as syphilis, disorders of menstruation, "cold," diabetes, etc. 1. The central scotomata are almost invariably confined to red and green; it is rare to find even blue affected and almost never yellow or white. 2. The scotomata and visual disturbances are bilateral. 3. Vision does not fall below $\frac{6}{200}$. 4. The form of the scotoma is that of an oval which usually include and stretches from the fixation point to the blind spot and lies above the horizontal meridian. 5. The vision becomes *gradually* less. 6. The disease

affects almost always men. 7. Of more than 40 years of age. 8. *Pain is noticed on extreme ocular movements in the essential retrobulbar neuritis of women, but is invariably absent in the toxic form.*

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(*To be Continued.*)

FURUNCULOSIS OF THE EXTERNAL AUDITORY CANAL.

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THE circumscribed inflammation of the external auditory canal, or furuncles in the canal, is an exceedingly painful and distressing affection, and is often very annoying to both the patient and the physician. The etiology of this affection is somewhat obscure. There exists in all cases, a general discrasia and a predisposition to such troubles, and yet many a one who has suffered from a boil in the ear, or a succession of them, has never had them elsewhere upon the body.

Some authorities give as a cause, the ingestion of rich and unwholesome articles of food, or over-indulgence in the gaieties, pleasures and good things of life.

But on the other hand, the debilitated and anæmic, and those whose circumstances preclude the possibility of any such over-indulgence, are frequently sufferers from this disease. There is certainly some condition which favors the development of a suppurative process as an underlying cause, together with some infection by means of the entrance of pus-producing germs in some manner, as an exciting cause, in all these cases.

The staphylo-coccus pyogenus aureus and the strepto-coccus pyogenes are most probably the microbes which are responsible. "Lowenberg has suggested that furunculosis of the external canal may be caused by the presence in the blood of a peculiar microbe. He claims to have found it in the pus of a freshly lanced boil in the meatus." (Burnett).

That the ordinary causes that tend to the production of pus are the causative agents in this affection is clearly indicated to the writer by the many times he has seen furuncles appear in the canal during the progress of an acute or chronic otitis media suppurativa, where

the pus from the middle ear constantly bathed the walls of the canal. And what aurist has not had his treatment of a middle ear trouble, as far as local applications were concerned, seriously hindered by the occurrence of a furuncle, or a crop of them, which entirely closed the external canal for a time.

Most commonly this inflammation is limited to the skin, or to the subcutaneous cellular and fibrous tissues, but sometimes it extends to the deeper structures, involving the periosteum even. It may occur at any portion of the canal, but most frequently it is in the outer two-thirds.

The pain in these cases is very severe, preventing sleep and causing the patient's countenance to very quickly assume the appearance of intense suffering. The onset is sudden and without any warning whatever, and is attended with more or less constitutional disturbance, elevation of temperature, anorexia, constipation and general malaise. One or several boils may appear at a time, or there may be a succession of them, a new one appearing as rapidly as the preceding one disappears.

A diagnostic point of value may often be elicited by the very first manipulation we make when we come to examine such a case. As we take the auricle between the fingers and draw it upward and backward to straighten the canal for the introduction of the speculum, the patient will wince or perhaps cry out on account of the pain which even such slight traction causes.

Another point is the pain caused by every movement of the jaws in eating, which adds greatly to the discomfort of the patient. The attempt at introduction of a speculum is exceedingly painful, and often such a procedure is impossible on account of the pain and also the narrowing of the lumen of the canal.

In most cases no view of the membrane, or even of the deeper portions of the external canal can be obtained. So that often if there are symptoms pointing to a middle ear trouble, a diagnosis may be at first difficult to make.

And, also, there may be a combination of an acute otitis media, which has not yet reached the point of perforating the membrane and discharging, and a furuncle which entirely closes the external canal, and such a case is indeed quite puzzling sometimes.

The skin at the location of the furuncle is tense, very much reddened and exceedingly sensitive, the slightest touch causing severe pain. If suppuration occur and the boil opens of itself, or is lanced, there is more or less destruction of tissue as a consequence. In the severest cases this destruction may extend and so involve the

deeper parts as to cause large abscesses and considerable sloughing of the cellular and fibrous layers or even the periosteum; but such cases are rare.

The hearing power is impaired in proportion to the amount of swelling and the consequent closure of the canal. And also when a boil occurs far back in the canal the inflammation may extend to the membrane itself, and the resulting myringitis reduces the hearing power greatly, and also complicates the diagnosis. But the hearing returns very quickly and completely upon the cessation of the trouble.

This disease yields very readily to proper and judicious treatment, and a favorable prognosis can always be given. If the trouble has existed for some little time and the patient is becoming exhausted from the continued suffering, or if the swelling is great and a point is seen which has opened a little, or is about to open, then an incision with the knife is the quickest and most efficient means of relief. But I believe that this will rarely be called for. If it is seen early in its course, I believe that a furuncle in the ear can be aborted in the large majority of cases.

The local abstraction of blood by means of one or two leeches applied to the tragus may be of service, but even this is rarely necessary. A brisk purge will effect sufficient depletion, and should be one of the first steps in the treatment. One or two grains of calomel given in one-eighth or one-fourth grain doses one hour apart, is the favorite mode with the writer.

Dry heat, in the form of hot flannels, a hot salt-bag or a hop-pillow, applied to the ear, is ordered for the relief of the pain. And in exceptional cases, morphine in eighth-grain doses is prescribed for the first day or two. The surface of the swelling is covered well with an ointment consisting of twenty grains each of extract of arnica and extract of belladonna to an ounce of lanoline, or whatever base is preferred. A pledget of cotton is inserted into the canal as tightly as can be borne, and the patient told not to remove it unless the pain caused by its pressure is too severe. This is repeated each day, or twice a day if possible, and under such treatment a furuncle will disappear very readily.

If the swelling is so great as to render the application of the ointment difficult, a very nice application is equal parts of the "black-wash," the officinal lotio nigra, and glycerine. A small pledget of cotton is thoroughly soaked in this and placed well into the canal and left there for ten or fifteen minutes and then it is replaced by a dry piece, put in as tightly as possible.

Burnett recommends the "black-wash" alone, and also an ointment of Hydrargyri ammoniati grains one to two to the ounce of some base, such as cold cream. Dr. H. N. Spencer, of this city, speaks very highly of the use of a 4 per cent solution of icthyol in water, applied in the same manner as the "black-wash" and glycerine. If it is thought best, the pledget of cotton wet with the solution may be allowed to remain in the meatus, instead of its being replaced by a dry one. In one case under the writer's observation the solution of icthyol certainly seemed to act well. Cholewa (*Berlin, Monatschr. f. Ohrenheilk, etc., 1892, No. 3.*) has advised the use of a 10 per cent solution of menthol oil introduced on cotton pledgets, claiming that the pain is releived the first day, and that new boils do not appear. The menthol is said to stop the development of the staphylo-coccus pyogenus aureus and the strepto-coccus pyogenes.

The constitutional treatment of these cases is very important. The cause of the trouble should be sought out and eradicated from the system if possible. Most patients will need a tonic treatment, and some of the preparations of iron and quinine should be prescribed, as the individual case may suggest.

Sexton and others speak well of the use of sulphide of calcium in small doses. Each case must stand on its own merits and be treated, both locally and constitutionally, as the conditions may demand.

And with a little careful attention a furuncle in the ear may soon be disposed of, and the development of new ones prevented.

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THREE CASES OF DISLOCATION OF THE LENS OCCURRING IN CATARACT EXTRACTION, SHOWING THREE OF THE POSITIONS THE LENS MAY ASSUME.

QUESTION AS TO THE REGENERATION OF THE VITREOUS.

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CASE I. Nov. 1892.—Mr. Long, aged 79, cataract O. S. In this eye Mr. L. had been struck with a stone in 1870, since which time the eye had been useless. Condition of eye as follows: Complete obliteration of the pupil; the iris being at its pupillary edge adherent everywhere in a large corneal scar, situated centrally and extending inward to within 1 mm. of the scleral edge. Anterior chamber nearly obliterated. Tension of the ball below normal. Patient could, however, distinguish between night and day. As O. D. did not have useful vision, an attempt was made to see if vision could be obtained from O. S. An upward and outward iridectomy was done, the iris being torn with the forceps from its adhesions, a part of which were to the lens capsule. The eye healed kindly. Condition then as follows: Lens found to be cataractous; iris below the false pupil adherent for a small extent to the lens capsule; iris everywhere adherent at the original pupil in the corneal scar; iris above the false pupil not adherent to the lens, but drawn toward the corneal scar. As soon as the corneal wound healed a small cataract knife was passed into the cornea at its margin below the line of the false pupil, and then upwards as far as the extremely shallow chamber would allow to the point of counter puncture, making an upward and outward corneal section, somewhat less than half the cornea because of the shallowness of the anterior chamber. Just as the fluid from the anterior chamber escaped, and before the corneal section was complete, the cornea collapsed and the lens dislocated. The dislocation of the lens separated the adhesion between the anterior capsule and the iris, and this saved me the trouble of mak-

ing a second iridectomy. *The lens presented in the wound and was extracted with its capsule intact.* The cataract was Meibomian, the lens having an extremely small yellow nucleus, diameter 2 mm., surrounded by a thick zone of a milky consistency and color. The eye healed without complication. As the immediate result of the operation, $V=\frac{20}{100}$.

CASE II. JAN. 19TH, 1893.—James S., aged 59; cataract O. D.; had appeared thirteen years ago; Meibomian in character; extremely small nucleus, movable with the position of the head, could be seen in most dependent part of the lens; the instant the corneal section was complete, fluid vitreous began to pour out of the wound. *The lens dislocated downward so that its upper edge could be seen below the upper pupillary margin.* The lens capsule did not rupture. A fine bent wire scoop was inserted into the eye, below the lens, which was extracted with its capsule entire. The capsule ruptured as I attempted, after its extraction, to pick the lens up; the nucleus was found to be about 2 mm. in the broadest diameter, $\frac{1}{2}$ to 1 mm. thick; the rest of the cortex of the lens being perfectly fluid. Considerable vitreous escaped during the extraction, and a spasm of the lids forced more out. The eye, however, healed without a complication, and the vision was excellent. The patient did not know how to read, but with a + 8 D. sph. could see distinctly the fine markings in his pocket rule. He was a carpenter.

CASE III.—Patient aged 59; cataract O. S.; had begun to form eight years previously. A small central yellow nucleus could be seen under indirect illumination, while the greater part of the remainder of the lens seemed to be more or less degenerated. The lens showed, however, considerable clear substance. Operation Feb. 26th, 1893. Corneal section without difficulty, but the instant it was complete watery vitreous began to escape from the eye. The iris contracted and the *lens dislocated upward, beneath the iris.* The vitreous continued to escape from the eye. The patient showed much desire to contract the lids. Unlike Case II, no scoop could be gotten under the lens, owing to its path of dislocation. The lack of control over the lids made me fear if I removed the speculum a contraction of them would cause the eye to be emptied of everything, for the vitreous was scarcely of greater consistence than water and was constantly escaping. I did an iridectomy, after which, with a small one-prong hook, I got beneath the lens and extracted the nucleus and considerable of the cortical matter. The nucleus was hard and yellow, and was about

3 mm. broad by 1 mm. thick, and attached to it was a considerable amount of shreddy cortical matter, showing that absorption of the nucleus had progressed to a great degree. *The eye had collapsed to about one-half its normal size.* The lens capsule did not rupture at the time of the dislocation. The loss of vitreous was so great that I had no hope of saving the eye. The usual bichloride wet compress was applied, the patient was put to bed and except that the compress was moistened with bichloride ($\frac{1}{2000}$), the eye was not disturbed until the fifth day. In the meantime the patient had not complained of any pain about the eye that required looking into. The dressings were changed on the fifth day, but the eye was not examined until the seventh day, *when it was found to have acquired its original size and shape; the anterior chamber had become re-established*, and while the upper four-fifths of the pupillary area was filled with cortical matter, the lower one-fifth was free, and the patient could see the outlines of objects. Atropia daily and hot water to the lids twice daily was the further treatment. Under this the cortical matter was absorbed.

APR. 22ND, 1893.—Patient does not know how to read. The vision of this eye, is, however, sufficient to allow him to make out the numbers on the houses and "to see a man distinctly two and a half squares off."

The above three cases have been reported somewhat at length to serve as illustrations of three of the positions the lens may assume when, for any reason, it becomes dislocated after the usual corneal section for cataract extraction; and they serve further, to show that, when in these cases the zonula ruptures, the result of the extraction may not depend so much upon the skill of the operator, as upon the position the lens assumes as the result of the destruction of the equilibrium of the contents of the eye. In the first case a preliminary iridectomy had been done. *The lens in its capsule dislocated into the artificial coloboma* and was extracted entire by the usual double spatula method. This case would seem to indicate that the proper method for extraction where we have reason to fear dislocation of the lens or rupture of the zonula is with a preliminary iridectomy, done about two weeks before the extraction is attempted. The cases where we have reason to fear rupture of the zonula seem to be those where the lens has become cataractous and slowly as the result of disease—not old age—and where the cataract has existed for a considerable number of years, and, of course, certain traumatic cataracts; and in all of these cases the eye has a "suspicious feel," which the practiced

hand soon learns to know and the tension is generally minus. In Case II, no iridectomy had been done; following the corneal section was rupture of zonula, escape of vitreous, *dislocation of the lens downwards.* The vitreous continued to escape. As the upper border of the lens could be seen, no iridectomy was done; a bent wire scoop was inserted through the corneal wound beneath the lens which was pressed up against the cornea, and extracted with the assistance of a spatula used upon the outer surface of the cornea. Fortunately the lens' capsule did not rupture, and though the loss of vitreous was greater than was pleasant, the eye healed without complication, and gave excellent vision. In the third case, immediately following the corneal section *the lens dislocated upwards behind the iris into the vitreous.* The escape of the vitreous, which was almost watery in consistence, was profuse; and the flow was so rapid and steady that the eyeball began to collapse. The question was what to do? It looked as if an iridectomy would allow the vitreous to escape only the faster—it was, however, escaping then from the whole length of the wound. The lens was dislocated and in such a manner that no scoop or hook could be gotten beneath it with the iris intact. The eye could be closed, the lens left in position, and a second extraction could be attempted should the wound heal kindly—but I could not see that circumstances would be then more favorable for extraction—and, besides, the constant presence in a fluid vitreous of a dislocated lens was not to be desired. I tried to force the lens downwards so that a hook could be gotten beneath it, but failed. An iridectomy was then done, after which I succeeded in getting a hook beneath the lens, the capsule ruptured, but the nucleus and considerable of the cortex came away with the hook. The eye had by this time lost apparently half of its fluid contents and as I had no hope of saving the eye I removed the remainder of cortex as best I could. The eye was carefully bandaged under a wet bichloride compress and not disturbed for seven days. The result has been stated above. Had the vitreous been of greater consistence the gravity of the situation would have been much less. In a similar case when the corneal section had been made I should proceed in a similar manner; but, hereafter, where I have reason to fear dislocation of the lens a preliminary iridectomy will be given the preference. *The fluidity of the vitreous.* Here we have an eye where about one-half of the contents are lost, and yet in the short space of a few days the eye has regained its normal size and tension. This brings up the question: "Is there a regeneration of vitreous in such cases?" At

first blush, such would seem to be the case. Who operating for cataract has not had cases where considerable vitreous has been lost and yet the eye has healed kindly and has preserved an excellent amount of vision? It would seem that in these cases but one of two things could happen, either the vitreous is regenerated, although the regenerated form may differ in some respects from normal, healthy vitreous, or the aqueous gland supplies the secretion, which being equally diffused through the frame work of the remaining vitreous may cause it to adapt itself to the shape of the eye, in this case, the constituents of the aqueous must be such that its presence in the vitreous even in large quantities has little or no tendency to cause an immediate clouding of the vitreous. It would seem that the latter is more likely to be the case, and that the fluid that brings the vitreous mass up to a sufficient quantity to fill out the shape of the eyeball is aqueous. In connection with Case III, this question and the further one, how long will the excellent vision obtained last assume considerable importance. It shows further that detachment of the retina is not an early necessary result of loss of considerable vitreous.

SOME OBSERVATIONS AS TO THE FREQUENCY OF PULSATING VEINS, CILIO-RETINAL VESSELS AND PHYSIOLOGICAL EXCAVATIONS OF THE NERVE-HEAD.

By C. A. Veasey, M. D.,

of Philadelphia,

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In the London Ophthalmic Hospital reports for 1888 and 1889, Lang and Barrett have recorded their observations as to the frequency of pulsating veins and cilio-retinal vessels, made in sixty-one eyes, which are as follows: Pulsating veins were found in 73.8%, doubtful in 14.8%, absent in 11.4%. Cilio-retinal vessels were observed in 16.7%, doubtful in 6.3%, absent in 77%. The ages of the patients ranged from 11 to 65 years and the observations were all made under mydriasis.

At the suggestion of Dr. G. E. de Schweinitz, I have examined a series of cases in the Jefferson Medical College Hospital and have compared them with a second series recorded in the Philadelphia Polyclinic.

All of the observations were made under mydriasis and in consecutive refractive cases. Appended are the two tables of cases.

The observations of Dr. de Schweinitz, with which he has kindly furnished me, were tabulated by Dr. Frances Janney.

In speaking of the pulsating veins and physiological excavations, no case was recorded as such unless the pulsation was distinctly seen or the excavation decidedly marked, not merely a depression. By a cilio-retinal vessel I mean a vessel that has pierced the disc and passed on to the retina.

In my own table there are sixty cases or one hundred and twenty eyes. Thirty-six of these are females, and twenty-four males, the ages ranging from six to forty-five years.

In seventy eyes, or 58.3%, pulsating veins were observed, and in seven eyes, or 5.8%, they were doubtful, on account of the high degree of myopia or mixed astigmatism which existed. In forty-three eyes, or 35.9%, the pulsation was absent.

There was unilateral pulsation in fourteen cases, or 23.3%, and bilateral in twenty-nine cases, or 48.3%.

Cilio-retinal vessels were seen in seventeen eyes, or 14.2%, and in five of these there were two vessels. The position of these vessels in ten of the eyes in which there existed single vessels was in the lower temporal quadrant of the disc, or "down and out," as it is so frequently expressed. In three of the five eyes in which two vessels were found one vessel was "down and out," so that in thirteen of the seventeen eyes in which cilio-retinal vessels were observed, or 76.4%, the position was in the lower temporal quadrant of the disc. In the majority of cases, when observed, it was unilateral.

In twenty-nine of the eyes, or 24.2%, there were physiological excavations, and in five of these the excavations were unilateral.

The table of Dr. de Schweinitz shows thirty-six cases, or one hundred and thirty-two eyes. Fifty of these cases were females and sixteen were males, whose ages ranged from eight to fifty-six years. Eighty-two eyes, or 62.1%, showed pulsating veins; of these, thirteen cases, or 19.6%, were unilateral, and thirty-five cases, or 53%, were bilateral. Pulsation was absent in fifty eyes, or 37.9%.

The number of eyes in which cilio-retinal vessels were observed was fourteen, or 10.6%. The positions of the vessels have not been recorded in all of the cases, though the majority of those given are in the lower temporal quadrant of the disc, thus agreeing with the results of the other table. There is only one case in which two cilio-retinal vessels were observed in the same eye.

There were thirty-four eyes with physiological excavations, or 25.7%, all bilateral.

To recapitulate, we have:

	Lang & Barrett. per cent.	de Schweinitz. per cent.	Veasey. per cent.
Pulsating veins in	73.8	62.1	58.3
Cilio-retinal vessels in	16.7	10.6	14.2
Physiological excavations	.....	25.7	24.2

The position of the cilio-retinal vessels in the greater proportion of cases was in the lower temporal quadrant of the disc.

Again, taking the number of cases as a basis, we have.

	de Schweinitz. per cent.	Veasey. per cent.
Unilateral pulsating veins in	19.6	23.3
Bilateral pulsating veins in	53.0	48.3

REMARKS.

All of the observations were made under mydriasis because the eye-grounds could be more clearly seen and because a trial of several cases both with and without a mydriatic showed no difference in the results. Another reason for using a mydriatic was to determine accurately the refractive error, so as to study the relation, if any existed, between the results of the observations and the ametropia.

The results are of considerable interest, inasmuch as they result from three series of cases which compare favorably.

It is only just, however, to add that the condition of the veins, as regards pulsation, is very changeable, as frequently they will begin or cease to pulsate while being examined; still, it seems that when the results of the three series are so nearly alike, a fair estimation of the proportion of eyes in which pulsating veins exist has been made.

Nothing in common was found in those cases in which it was absent.

Case No.	Sex.	Age.	RIGHT EYE.					LEFT EYE.				
			Cup.	Pulsating Vein.	Cilio-Retinal Vessel.	Position.	Refractive Error.	Cup.	Pulsating Vein.	Cilio-Retinal Vessel.	Position.	Refractive Error.
1	F	21	Yes	Yes	No	No	H+Ah	Yes	Yes	No	No	H+Ah
2	F	16	No	Yes	No	No	Ahm	No	Yes	No	No	Ahm
3	F	18	Yes	Yes	Yes (2)		H	Yes	No	No	No	H
4	F	32	Yes	No	Yes	Temporal half of disc.	Ah	Yes	No	No	No	Ah
5	F	20	No	No	No	No	H	No	Yes	No	No	H
6	F	15	No	No	No	No	H+Ah	No	Yes	No	No	H+Ah
7	M	13	No	No	No	No	H+Ah	No	No	Yes		H+Ah
8	F	32	No	No	No	No	H+Ah	No	No	No	No	H+Ah
9	F	35	No	Yes	No	No	H	No	Yes	No	No	H
10	F	10	Yes	No	No	No	H	Yes	Yes	No	No	H
11	F	19	Yes	Yes	No	No	H	Yes	Yes	No	No	H
12	F	8	No	No	No	No	H	No	No	No	No	H
13	M	48	No	Yes	No	No	H	No	Yes	No	No	H
14	F	28	No	No	Yes	Up and out	H+Ah	No	No	No	No	H+Ah
15	F	19	No	No	No	No	H	No	Yes	No	No	H
16	F	34	Yes	Yes	No	No	H+Ah	Yes	Yes	No	No	H+Ah
17	F	18	Yes	Yes	No	No	H	Yes	No	No	No	H
18	F	21	No	No	Yes		H	No	No	No	No	M+Am
19	M	26	No	No	No	No	H+Ah	No	No	No	No	H+Ah
20	M	24	No	No	Yes		H	No	Yes	No	No	H
21	F	28	No	Yes	No	No	Ah	No	Yes	No	No	H+Ah
22	F	10	No	Yes	Yes	Down and out	H	No	No	No	No	H
23	M	18	Yes	No	Yes	Down and out	H	Yes	No	Yes	Down and out	H
24	F	28	Yes	Yes	Yes	Down and out	H	Yes	No	No	No	H
25	M	40	Yes	Yes	No	No	H	Yes	Yes	No	No	H
26	M	32	No	No	No	No	M+Am	No	No	No	No	M+Am
27	F	25	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
28	F	16	No	Yes	No	No	H	No	Yes	No	No	H
29	F	11	Yes	No	No	No	H	Yes	Yes	Yes		H

30	F	23	No	No	No	No	H	No	No	No	No	H
31	F	11	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
32	M	53	No	Yes	No	No	M+Am	No	No	No	No	M+Am
33	F	16	No	Yes	No	No	H	No	Yes	No	No	H
34	F	29	Yes	Yes	No	No	Ah	Yes	Yes	No	No	Ah
35	F	37	No	Yes	No	No	H	No	Yes	No	No	H
36	F	20	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
37	F	40	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
38	F	18	No	Yes	No	No	H+Ah	No	No	No	No	H+Ah
39	F	24	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
40	F	36	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
41	F	26	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
42	M	44	No	No	No	No	H	No	No	No	No	H
43	F	19	No	No	No	No	H	No	No	No	No	H
44	M	32	No	No	No	No	H+Ah	No	No	No	No	H+Ah
45	M	23	No	Yes	No	No	H	No	Yes	No	No	H
46	F	39	Yes	Yes	No	No	H+Ah	Yes	Yes	No	No	H+Ah
47	F	33	Yes	No	No	No	H	Yes	No	No	No	H
48	F	33	No	Yes	No	No	H	No	Yes	No	No	H+Ah
49	F	15	No	No	No	No	H	No	No	No	No	H+Ah
50	M	31	No	No	No	No	M	No	No	No	No	M
51	M	48	No	Yes	No	No	H+Ah	No	No	No	No	H+Ah
52	F	18	No	No	No	No	H	No	No	No	No	H
53	F	19	No	Yes	Yes	Down and out	H	No	No	No	No	H
54	F	26	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
55	M	20	Yes	Yes	No	No	H+Ah	Yes	Yes	No	No	H+Ah
56	M	36	Yes	Yes	No	No	H+Ah	Yes	Yes	No	No	H+Ah
57	F	21	No	No	No	No	H	No	No	No	No	H
58	F	30	Yes	Yes	No	No	H+Ah	Yes	Yes	No	No	H+Ah
59	F	56	No	Yes	No	No	H	No	Yes	No	No	H+Ah
60	F	43	No	Yes	No	No	H	No	Yes	No	No	H
61	F	22	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
62	F	24	No	Yes	No	No	Ah	No	Yes	No	No	Ah
63	F	27	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
64	F	23	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
65	M	50	No	Yes	No	No	H	No	Yes	Yes		H
66	F	21	No	Yes	Yes		H+Ah	No	Yes	No	No	H

Case No.	Sex.	Age.	RIGHT EYE.					LEFT EYE.				
			Cup.	Pulsating Vein.	Cilio-Retinal Vessel.	Position.	Refractive Error.	Cup.	Pulsating Vein.	Cilio-Retinal Vessel.	Position.	Refractive Error.
1	M	35	No	No	No	No	H	No	No	No	No	H
2	M	8	No	Yes	No	No	H	No	Yes	No	No	H
3	F	28	No	No	No	No	Ah	No	No	No	No	Ah
4	M	37	Yes	Yes	No	No	H+Ah	Yes	Yes	No	No	H+Ah
5	M	23	No	Yes	No	No	H	No	No	No	No	H
6	M	30	No	No	No	No	M	No	No	No	No	M
7	F	24	No	No	No	No	H+Ah	No	No	No	No	H+Ah
8	F	13	Yes	Yes	Yes	Down and out	H	Yes	No	Yes	Down and out	H
9	F	21	No	Yes	No	No	H+Ah	Yes	No	No	No	H+Ah
10	F	22	No	No	No	No	H+Ah	No	No	No	No	H+Ah
11	M	23	No	No	No	No	H	No	No	No	No	H
12	F	28	No	No	No	No	H+Ah	No	No	No	No	H+Ah
13	M	18	No	No	No	No	H+Ah	No	Yes	Yes	Down and out	H+Ah
14	F	45	No	No	No	No	H	No	No	No	No	H
15	F	18	No	Yes	No	No	H	No	No	No	No	H
16	F	38	No	No	No	No	H+Ah	No	Yes	No	No	H+Ah
17	F	28	No	Yes	No	No	H+Ah	No	No	No	No	H+Ah
18	M	29	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
19	F	20	Yes	Yes	No	No	H+Ah	Yes	No	No	No	H+Ah
20	F	18	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
21	M	20	No	No	No	No	H+Ah	No	No	No	No	H+Ah
22	F	21	No	Yes	No	No	H	No	Yes	No	No	H+Ah
23	F	14	Yes	Yes	No	No	H+Ah	Yes	Yes	No	No	H+Ah
24	F	23	Yes	No	No	No	M	Yes	No	Yes	Down and out	M
25	M	24	No	Yes	No	No	H+Ah	Yes	Yes	No	No	H+Ah
26	M	37	Yes	No	Yes	Up and in	H	Yes	No	No	No	H
27	F	8	No	Yes	Yes (2)	Up and in Down and in	H+Ah	No	No	No	No	H+Ah
28	F	18	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah

*29	F	33	No	Doubtful	No	No	M	No	Doubtful	No	No	M
30	M	30	No	No	No	No	H	No	No	No	No	H
31	F	42	Yes	Yes	Yes	Down and out	H	Yes	No	No	No	H
32	F	16	No	Yes	Yes	Down and out	H+Ah	No	No	Yes (2)	Both up and out	H+Ah
33	M	22	Yes	No	No	No	H+Ah	Yes	No	Yes	Down and out	H+Ah
34	F	16	No	No	No	No	H	No	Yes	Yes	Out—juncture of upper and lower quadrants	H
35	F	13	Yes	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
*36	F	35	No	Doubtful	No	No	M+Am	No	Doubtful	No	No	M+Am
37	F	38	No	Yes	No	No	M+Am	No	Yes	No	No	M+Am
38	F	16	No	No	No	No	H+Ah	No	No	No	No	H+Ah
39	M	6	Yes	Yes	No	No	H	Yes	Yes	No	No	H
40	F	30	No	No	No	No	H+Ah	No	Yes	No	No	H+Ah
41	M	25	No	Yes	Yes (2)	Down and out Up and in	H	No	Yes	Yes (2)	Down and out Up and in	H
42	F	10	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
43	F	18	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
44	F	14	No	No	No	No	H	No	Yes	No	No	H
45	F	25	No	Yes	Yes (2)	Down and out Up and out	H	No	Yes	No	No	H
46	F	16	Yes	Yes	No	No	H+Ah	Yes	Yes	No	No	H+Ah
47	M	28	Yes	Yes	Yes	Down and out	H	Yes	Yes	No	No	H
48	M	14	No	Yes	No	No	H	No	Yes	No	No	H
49	M	19	No	Yes	No	No	H	No	Yes	No	No	H
†50	M	9	No	Yes	No	No	Amh	No	Doubtful	No	No	Amh
51	M	21	No	Yes	No	No	M+Am	No	Yes	No	No	M+Am
52	M	27	No	Yes	Yes	Down and out	H+Ah	No	Yes	No	No	H+Ah
53	F	12	Yes	Yes	Yes	Down and out	H	No	Yes	No	No	H
54	F	29	No	Yes	No	No	H+Ah	Yes	Yes	No	No	H+Ah
55	F	24	Yes	Yes	No	No	Ah	Yes	Yes	No	No	Ah
56	M	40	No	Yes	No	No	H	No	Yes	No	No	H
57	M	22	No	Yes	No	No	H+Ah	No	Yes	No	No	H+Ah
58	M	28	No	Yes	No	No	H	No	Yes	No	No	H
59	F	28	No	No	No	No	H	No	Yes	No	No	H
†60	F	14	No	Doubtful	No	No	Ahm	No	Doubtful	No	No	Ahm

*Doubtful on account of the high degree of myopia present. †Doubtful on account of the high degree of astigmatism present.

A CONVENIENT PRISM SCALE.*

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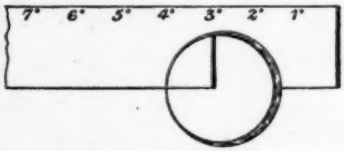
THE need for a more accurate and rapid method of testing and neutralizing prismatic lenses, either singly or in combination with spheres and cylinders, has been strongly emphasized by the increasing interest and attention devoted to the study of heterophoria, and the broader clinical application of prisms for its relief.

To [1]Maddox is probably due the credit of first suggesting a "Prism Scale" for this purpose. In his little work on prisms, published in July, 1889, he states that in the year 1886 he arranged



(Fig. 1.)

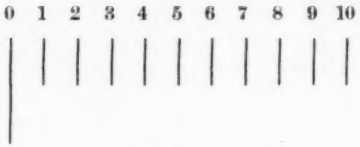
for Messrs. Pickard and Curry, of London, a scale for measuring the deviating angles of prisms. (Fig. 1) This was numbered in tangents of degrees arranged on a horizontal plane, and adjusted to show the amount of deviation at a distance of two meters. The scale was also provided with an index line and a base line, both very important, but was without any linear gradations to designate the degrees.

In October, 1891, [2]Prentice, in one of his learned papers on the optical principles of prisms, suggested his "Prismometric Scale," (Fig. 2) which he based on the prism-dioptry as a unit. This scale,

*Read before the Ophthalmological Section of the American Medical Association at its meeting in Milwaukee, June 6th, 7th, 8th and 9th, 1893.

[1] Maddox on "Clinical Use of Prisms," Page 29.

[2] American Journal of Ophthalmology, Oct., 1891.



(FIG 2.)

like that of Maddox, was arranged on a horizontal plane, with a prominent index line, but lacking the very important base line. It was further provided with gradations so adjusted as to show the deflection at the longer range of six meters.

In order to make a prism scale meet all the indications which its use demands, there are certain requirements which we may consider absolutely essential. In the first place, such a scale should have a prominent *base line* by which the prismatic lens may be kept in perfect alignment while testing. The slightest rotation of the base-apex line (axis) of such a prism above or below the horizontal base line of the scale not only impairs its value in that plane, but also causes a corresponding deviation in the vertical plane. If such a deviation should occur by mistake in a prescription glass, it would, of course, inflict on the patient an artificial hyperphoria. Another essential is the *index line*, which should register the exact number of degrees of deviation by its displacement along the scale. This scale should be laid out on a *plane* surface, and be marked with *linear gradations* to indicate each degree of deviation; and, if desired, the half degree also.

In practice I have found it very convenient to have *two* such scales, one arranged on a *horizontal* plane, and the other on a *vertical* plane. This enables the observer to quickly measure a pair of prismatic spectacles, while holding them in the same horizontal position in which the patient naturally wears them. In this way the exact degree is easily ascertained no matter in what direction the base of the prism is placed. To still further facilitate their practical application these two scales should be made in contrasting colors, e. g., the *horizontal* scale in *black*, and the *vertical* one in *red*. A combination scale of this character would prove of additional utility in the case of *resultant prisms*, which have for their effect the double action of two super-imposed prisms, placed exactly at right angles to each other, the axis of the one being vertical, and that of the other horizontal. By the use of such a scale we would secure, therefore, the twofold advantage of being able to read off both these values at once.

[1] Maddox, in 1889, laid down the mathematical formulæ whereby the values of such resultant prisms might be estimated; and [2] Wallace, in 1892, published an elaborate table of the degree and the angle of rotation for any required resultant prism. This latter table, however, possesses the single disadvantage of being expressed in minute fractions of a degree, which renders it almost impracticable, as it is extremely difficult for the optician to grind such a lens. It will probably be advisable, therefore, to avoid these fractions of a degree, and obtain the resultant prism expressed in whole numbers. This can be best accomplished by employing a very simple method based on the use of the prism scale, and easily applied by any oculist, even though not an expert mathematician, as we will attempt to demonstrate later on in this paper.

The prism-unit, which has elicited so much discussion as to the relative merits of "prism-dioptry" and "centrad," has by a graceful compromise been definitely established through the following resolution, presented by Drs. Jackson, Burnett and Randall:

[3] RESOLVED, "That the section on Ophthalmology of the American Medical Association, adopt and recommend as a standard or unit prism one which gives a *deflection of one centimeter at the distance of one meter*, and that this measurement may be taken on a *plane* up to No. 20." By this resolution the child was born, but without a name; in the absence of a better one, we will continue to call this prism-unit by the ancestral name of the "degree."

For practical purposes, it is more convenient to adjust the prism scale for use at a distance of two meters, which will require a corresponding amplification of the prism-unit, i. e., "a deflection of *two* centimeters at *two* meters." This will allow greater latitude of movement for the observer, with only half of the error at the shorter distance. The two-meter distance is, furthermore, better adapted for use in the offices of those oculists who do not possess the advantage of a full six-meter range; and as well for the many opticians who are compelled to do their grinding in limited quarters.

In order to properly meet all these indications I devised in January, 1889, a simple prism scale, which has proved of such great convenience in my own practice that I now desire to submit it to

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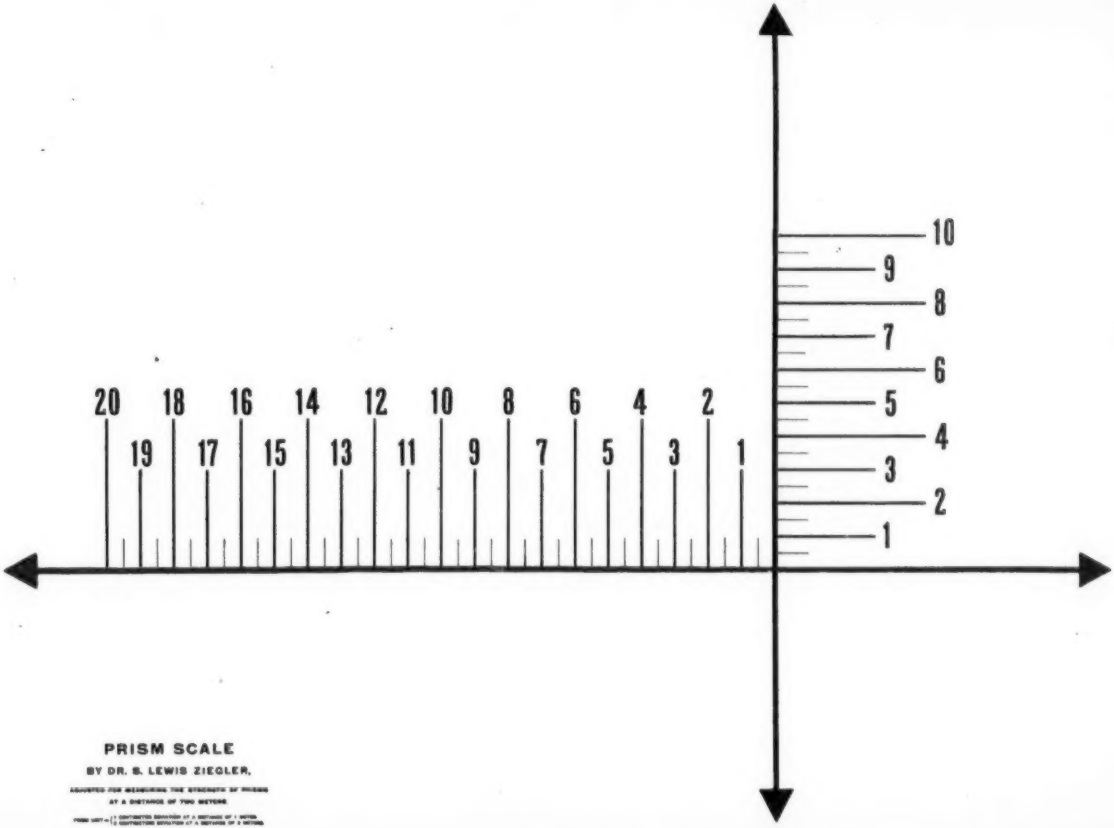
[1] "Clinical Use of Prisms," Pages 98 and 112.
[2] Annals of Ophthalmology and Otology, Vol. I., No. 2.
[3] Trans. Ophthal. Section American Medical Association, 1891, Page 7.



PRISM SCALE

BY DR. S. LEWIS ZIEGLER,

ADJUSTED FOR MEASURING THE STRENGTH OF PRISMS AT A DISTANCE OF TWO METERS

PRISM UNIT = [illegible]

PUBLISHED BY A.L. REICH & CO., PHILADELPHIA

the profession for a more extended trial. By constant use it has been modified and improved until it has finally assumed its present shape. To briefly summarize, it possesses the following qualifications:

1. The scale is arranged on a plane surface of cardboard or heavy paper.

2. The prism-unit is adjusted for "a deviation of two centimeters at a distance of two meters."

3. It possesses both a horizontal scale in black, and a vertical scale in red.

4. The index line of one scale is the base line of the other scale, and *vice versa*.

5. The index or base lines are heavier than the degree gradations, and terminate in arrow-head indicators.

6. The scale is graduated for degrees and half degrees, the horizontal scale extending to 20° and the vertical one to 10°.

7. For the sake of quick readings the even and odd numbers are arranged on different levels.

8. The two scales are so joined that the angle of a resultant prism can be easily ascertained before prescribing, or the strength as quickly measured after it has been ground.

This "Prism Scale," as described above, has been published for me by Messrs. J. L. Borsch & Co., of Philadelphia, who have had it handsomely lithographed.

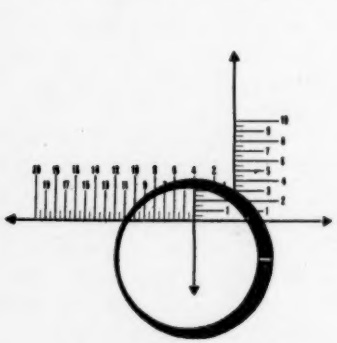
METHOD OF USE:—The Prism Scale should be framed[1] and hung on the wall of the room in a good light, with the horizontal base line (red) adjusted absolutely level, and about four to five feet from the floor. The observer will then stand facing the scale, and directly opposite the junction of the vertical and horizontal base lines. Hold the prism to be tested about nine inches in front of the eye, and at exactly two meters from the scale. The distance from the eye is immaterial so long as the prism remains on the two-meter line. A convenient method is to mark the two-meter range on the floor, and by experiment ascertain how far behind this the observer should stand. This distance will usually average about six inches. We can then draw a heavy line on the floor which should always be toed, and will make the range exactly at two meters when the prism is held nine inches from the eye. If we should prefer to work sitting down, the scale should be placed lower on the wall,

[1] A glass cover will prevent soiling from dust and dirt.

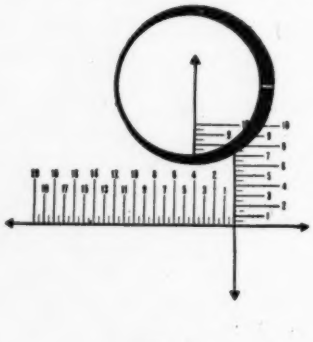
but still on a level with the observer's eyes. The most accurate method is to arrange for a permanent two-meter mark, by adjusting an upright standard on the floor, or by constructing a wooden arm to let down from the wall at the proper range, on either of which we may rest the lens while testing its strength.

We must now close one eye, and with the other one practice looking at the scale both *through* the prism and *over* it, as it is on the comparison of these two views that we get the required registration. Each of these dual fields should contain either the *indicator* singly or the *numbered gradations* singly, the prism being so held that the two fields shall be in conjunction at the margin of the lens. We next level up the prism by rotating it until the base line seen through the prism coincides and is continuous with the base line of the scale, and therefore indicates the axis of the prism. To avoid another possible source of error the plane of the prism should always be kept parallel with that of the scale, as any tilting tends to vitiate our result.

The index line will now be displaced along the scale until the indicator stands opposite the proper numbered gradation, thereby showing the strength of the prism. By rapidly moving the prism up and down along the gradation it can easily be seen whether the index line accurately coincides with the proper gradation, and thus shows the required strength. This reading may be taken in either one of two ways for each position of the prism. If, for example, we select a prism of 4° and place it with the base to the *right* (Fig. 3),



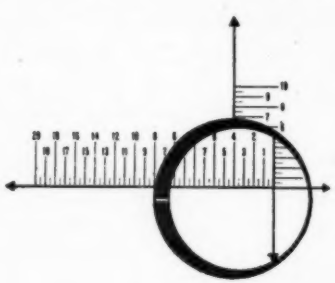
(FIG. 3.)



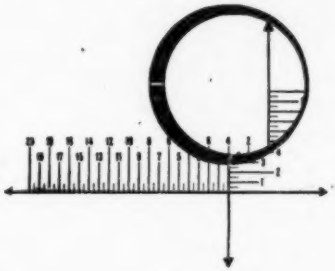
(FIG. 4.)

we will see the indicator through the prism standing directly *under* the No. 4, as seen just above the margin of the lens. The same result may be secured on the upper register (Fig. 4) by viewing the displaced indicator through the prism as it stands directly *above* the

4° gradation on the scale. If, however, we reverse the prism and place the base to the *left* we will find the indicator standing *above* the figure 4 as seen through the prism (Fig. 5), or in like manner *under* the 4° gradation (Fig. 6).

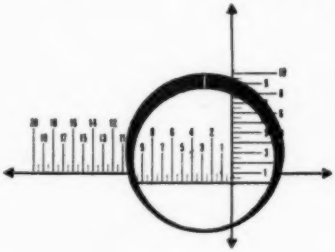


(FIG. 5.)

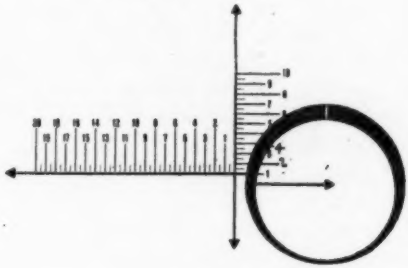


(FIG. 6.)

To measure a prism base *up*, we line up the axis to the vertical base line, the numbered gradations showing through the prism, and the indicator appearing just to the *right* (Fig. 7), or to the

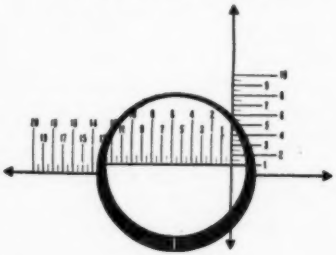


(FIG. 7.)

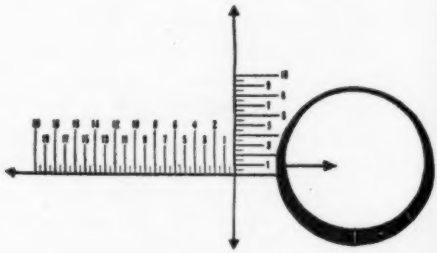


(FIG. 8.)

left (Fig. 8) of its edge; and, similarly, to ascertain the strength of a prism base *down*, we may hold the lens over the indicator and allow the numbers to show either to the *right* (Fig. 9), or to the *left* (Fig. 10)of the prism.



(FIG. 9.)



(FIG. 10.)

In some of the aforementioned positions it is possible to level up the prism on the base line while reading off the result, while in others we cannot do this when holding the prism in position. It is, however, an easy matter to do this before selecting the most convenient register. A little practice will soon furnish the greatest facility in the use of all these positions, whether on the base lines, or on the alternatives.

Resultant prisms are not very generally prescribed as such. The oculist usually prefers to order separately the individual vertical and horizontal prisms, thereby delegating to the optician the solution of the problem. The optician invariably performs his task by *neutralizing* the combination, and in this way resolves it into the equivalent resultant prism. As previously stated, we desire to avoid, if possible, such minute subdivisions of a degree as are impracticable for the optician to grind, and which the *exact* mathematical reduction must invariably give. We have, however, an easy and satisfactory solution of this problem based on a simple *clinical fact*, and accomplished by the use of our prism scale.

This clinical fact may be stated as follows: In hyperphoria it is necessary to order the *full* correction; while in exophoria or esophoria we may order anything from a *partial* correction to a *full* one, according to circumstances. I take it, therefore, that as the relief of a hyperphoric deviation requires a more *exact* correction than that of exophoria or esophoria, so the *vertical* prism should *exactly* correspond to whatever correction we decide to order; while for the *horizontal* deviation we may allow a *greater latitude* without impairing the efficiency of our correction, and may order the strength from $\frac{1}{2}^{\circ}$ less to $\frac{1}{4}^{\circ}$ more than the absolute amount obtained by the test, or that portion of it which we desire to prescribe. By granting this statement as true, we can immediately resolve our crossed prisms into a resultant prism of full degree, and thus avoid any fractional elements to disturb the manufacturing optician. Thus, to illustrate, should we desire to order a prism base up, combined with a prism base in, we would select from our trial case a prism equal to, or slightly stronger than the strongest prism in our combination, place this in the trial frame, and rotate its base-apex line up and in until the desired vertical strength is exactly registered on the vertical scale; then by looking along the horizontal scale it will be found that the reading corresponds so nearly to the desired prism that the error is inappreciable.

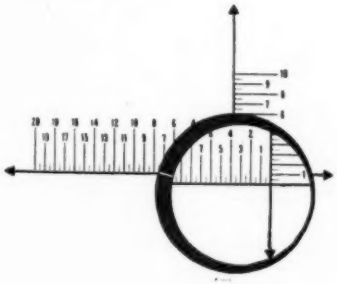
If, for example, we should wish to prescribe

℞ O. D. P 4° base in, ⌒ P 1° base up.

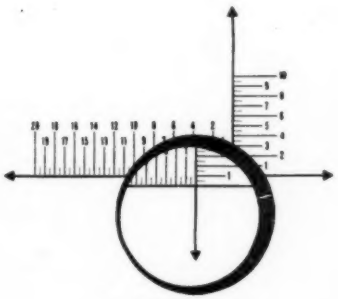
we would place P 4° in the trial frame with its base in, and rotate the base of the prism upwards until the vertical deviation registers exactly P 1° base up on the vertical scale, while at the same time the index line points to P $3\frac{3}{4}$° base in on the horizontal scale—thus showing a loss of only $\frac{1}{4}$° in the horizontal plane. If now we examine the trial frame we shall find the axis pointing to 15° on the protractor. Our prescription for the resultant prism would therefore read,

℞ O. D. P 4° base up ax. 15°.

If, however, this method should not satisfy the stickler for absolute accuracy, we may select one of two other methods. We can either place the required crossed prisms in the trial frame at the desired axes, rotate the entire trial frame, prisms and all, until the base line appears unbroken; then draw this axial line across the absolute center of the prisms with a pen, note the degree of rotation this axis indicates on the trial frame and at the same time read off the displacement along the scale. Or, by another method, we may secure a simple neutralization by placing a third prism in front of the other two, with its base opposing. If this be done accurately we can immediately note the degree of prism required together with its axis, and by simply reversing the base, record the resultant. (Any fraction remaining over can be noted on the scale, and added to the result.) These methods, however, require us to express our result in the smaller subdivisions of a degree. The result obtained, moreover, corresponds almost exactly to the mathematically accurate tables of Wallace, previously referred to. Either of these methods are likewise applicable in cases where we wish to secure the resultant of two prisms placed at *other* than right angles; and as well for the measurement of any prism at an oblique axis.



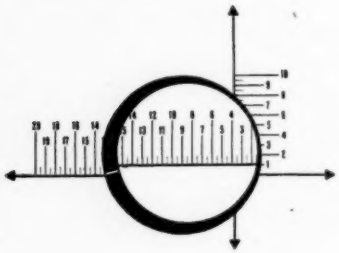
(FIG. 11.)



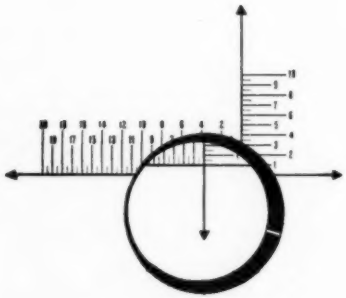
(FIG. 12.)

Reverting, however, to our first mentioned clinical method, which we have adopted as the most practical, we will proceed to illustrate the various positions which such a resultant prism may assume. For this purpose we will use our former example—a combination of P 1° vertical, and P 4° horizontal, the resultant of which is a 4° prism rotated 15° above or below the horizontal, and equivalent to a combination of P 1° vertical and P $3\frac{3}{4}$° horizontal.

A 4° prism with its base turned to the *left* and *up* will appear as in Fig. 11, or with its base to the *right* and *up* as in Fig. 12. If, however, the base is rotated to the *left* and *down*, we will have the appearance shown in Fig. 13, or with base to the *right* and *down* as in Fig. 14.



(FIG. 13.)



(FIG. 14.)

A table of these resultant prisms and their angles of rotation, based on this practical clinical method, is herewith appended, in order to avoid the necessity of each observer working out every combination for himself. (See page 272.)

We may neutralize these resultant prisms in one of two ways. We can either hold the spectacle lens horizontal, and read off the two prismatic strengths by the double deviation shown on the scale; or we can rotate the lens until the base line is unbroken, mark the axial line with a pen drawn across the absolute geometrical center of the lens, and read off the single resultant prism ordered. By laying the lens on a protractor we can note whether the axis is correct.

It may not be out of place to say a word in regard to the measurement of prisms when in combination with spheres and cylinders. In the first place, we must accurately adjust the optical center of our neutralizing lenses over the geometrical center of the combination to be tested before attempting to read off the prismatic strength, or we shall be disturbed by slight variations due to

artificial decentration. The exact optical center of a sphero-cylinder can be seen at a glance by looking through the lens at the junction of the vertical and horizontal base lines. This gives us the additional advantage of being able to compare the result found in one lens with the centering obtained in the other, which should be done with the greatest accuracy in order to detect the slightest *relative* differences, and especially any deviation in the vertical plane. This applies with particular force to the examination of bifocal lenses, the reading part of which I have several times found to have sufficient *relative decentration* to create an artificial hyperphoria of 1° for near, although the relation between the distance lenses was absolutely correct. In fact, I believe that this error of the manufacturing optician is one of the chief reasons for the inability of a very small percentage of presbyopes to wear these convenient and time-saving combinations.

We may add in conclusion that our prism scale possesses the *threefold* advantage of simultaneously showing us whether our lens is properly neutralized, whether it is accurately centered, and whether the prismatic strength is correctly measured. The daily use of the scale, and its practical application to our work will doubtless suggest many other advantages which it may possess. It is herewith submitted to the profession with the hope that it may not become "useless lumber for our attics," but may prove to be a useful addition to the practical working armamentarium of the oculist—and of the optician as well.

1504 Walnut Street.

TABLE OF EQUIVALENT PRISMS WITH THEIR RESULTANTS.

EQUIVALENTS		RESULTANTS	
Exact Vertical Prism	Approximate Horizontal Prism	Resultant Prism	Angle of Rotation
P ¼° ◯◯	P 1°	= P 1°	ax 15°
P ¼° ◯◯	P 1½°	= P 1½°	ax 10°
P ¼° ◯◯	P 2°	= P 2°	ax 8°
P ¼° ◯◯	P 3°	= P 3°	ax 5°
P ¼° ◯◯	P 4°	= P 4°	ax 4°
P ¼° ◯◯	P 5°	= P 5°	ax 3°
P ¼° ◯◯	P 6°	= P 6°	ax 2°
P ½° ◯◯	P ⅞°	= P 1°	ax 30°
P ½° ◯◯	P 1⅜°	= P 1½°	ax 20°
P ½° ◯◯	P 1⅞°	= P 2°	ax 15°
P ½° ◯◯	P 2⅜°	= P 3°	ax 10°
P ½° ◯◯	P 4°	= P 4°	ax 8°
P ½° ◯◯	P 5°	= P 5°	ax 6°
P ½° ◯◯	P 6°	= P 6°	ax 5°
P ¾° ◯◯	P ¾°	= P 1°	ax 45°
P ¾° ◯◯	P 1¼°	= P 1½°	ax 30°
P ¾° ◯◯	P 1¾°	= P 2°	ax 22°
P ¾° ◯◯	P 2¾°	= P 3°	ax 15°
P ¾° ◯◯	P 3⅞°	= P 4°	ax 11°
P ¾° ◯◯	P 4⅞°	= P 5°	ax 9°
P ¾° ◯◯	P 6°	= P 6°	ax 7°
P 1°	◯ P 1⅛°	= P 1½°	ax 40°
P 1°	◯ P 1½°	= P 2°	ax 30°
P 1°	◯ P 2⅜°	= P 3°	ax 20°
P 1°	◯ P 3¼°	= P 4°	ax 15°
P 1°	◯ P 4⅛°	= P 5°	ax 12°
P 1°	◯ P 5⅞°	= P 6°	ax 10°
P 1½°	◯ P 1⅜°	= P 2°	ax 45°
P 1½°	◯ P 2⅛°	= P 3°	ax 30°
P 1½°	◯ P 3⅝°	= P 4°	ax 22°
P 1½°	◯ P 4⅝°	= P 5°	ax 17°
P 1½°	◯ P 5¾°	= P 6°	ax 15°
P 2°	◯ P 2¼°	= P 3°	ax 40°
P 2°	◯ P 3⅛°	= P 4°	ax 30°
P 2°	◯ P 4½°	= P 5°	ax 23°
P 2°	◯ P 5⅝°	= P 6°	ax 20°
P 3°	◯ P 2½°	= P 4°	ax 50°
P 3°	◯ P 4°	= P 5°	ax 35°
P 3°	◯ P 5⅛°	= P 6°	ax 30°
P 4°	◯ P 3°	= P 5°	ax 50°
P 4°	◯ P 4¼°	= P 6°	ax 42°
P 5°	◯ P 3⅛°	= P 6°	ax 60°

TABLE OF RESULTANT PRISMS AND THEIR EQUIVALENTS.

RESULTANTS		EQUIVALENTS	
Resultant Prism	Angle of Rotation	Exact Vertical Prism	Approximate Horizontal Prism
P 1°	ax 15°	= P ¼° ◯◯	P 1°
P 1°	ax 30°	= P ½° ◯◯	P ⅞°
P 1°	ax 45°	= P ¾° ◯◯	P ¾°
P 1½°	ax 10°	= P ¼° ◯◯	P 1½°
P 1½°	ax 20°	= P ½° ◯◯	P 1⅜°
P 1½°	ax 30°	= P ¾° ◯◯	P 1¼°
P 1½°	ax 40°	= P 1° ◯◯	P 1⅛°
P 2°	ax 8°	= P ¼° ◯◯	P 2°
P 2°	ax 15°	= P ½° ◯◯	P 1⅞°
P 2°	ax 22°	= P ¾° ◯◯	P 1¾°
P 2°	ax 30°	= P 1° ◯◯	P 1½°
P 2°	ax 45°	= P 1½° ◯◯	P 1⅜°
P 3°	ax 5°	= P ¼° ◯◯	P 3°
P 3°	ax 10°	= P ½° ◯◯	P 2⅞°
P 3°	ax 15°	= P ¾° ◯◯	P 2¾°
P 3°	ax 20°	= P 1° ◯◯	P 2⅝°
P 3°	ax 30°	= P 1½° ◯◯	P 2½°
P 3°	ax 40°	= P 2° ◯◯	P 2¼°
P 4°	ax 4°	= P ¼° ◯◯	P 4°
P 4°	ax 8°	= P ½° ◯◯	P 4°
P 4°	ax 11°	= P ¾° ◯◯	P 3⅞°
P 4°	ax 15°	= P 1° ◯◯	P 3¾°
P 4°	ax 22°	= P 1½° ◯◯	P 3⅝°
P 4°	ax 30°	= P 2° ◯◯	P 3½°
P 4°	ax 50°	= P 3° ◯◯	P 2½°
P 5°	ax 3°	= P ¼° ◯◯	P 5°
P 5°	ax 6°	= P ½° ◯◯	P 5°
P 5°	ax 9°	= P ¾° ◯◯	P 4⅞°
P 5°	ax 12°	= P 1° ◯◯	P 4¾°
P 5°	ax 17°	= P 1½° ◯◯	P 4⅝°
P 5°	ax 23°	= P 2° ◯◯	P 4½°
P 5°	ax 35°	= P 3° ◯◯	P 4°
P 5°	ax 50°	= P 4° ◯◯	P 3°
P 6°	ax 2°	= P ¼° ◯◯	P 6°
P 6°	ax 5°	= P ½° ◯◯	P 6°
P 6°	ax 7°	= P ¾° ◯◯	P 6°
P 6°	ax 10°	= P 1° ◯◯	P 5⅞°
P 6°	ax 15°	= P 1½° ◯◯	P 5¾°
P 6°	ax 20°	= P 2° ◯◯	P 5⅝°
P 6°	ax 30°	= P 3° ◯◯	P 5½°
P 6°	ax 42°	= P 4° ◯◯	P 4¼°
P 6°	ax 60°	= P 5° ◯◯	P 3⅛°

NOTE.—All the *axes* recorded in the above table refer to only one side of the horizontal plane, but apply as well to the other side. Thus, P 4° ax. 15° on one side, would read P 4° ax. 165° on the other side (ax. 30° would thus become ax. 150°). In any one of these positions the base may be either *up* or *down*. Each resultant prism may, therefore, occupy one of *four* positions: e. g., P 4° base *up* ax. 15°; P 4° base *down* ax. 15°; P 4° base *up* ax. 165°; P 4° base *down* ax. 165°.

THE TREATMENT OF CHRONIC SUPPURATION IN THE MIDDLE EAR BY REMOVAL OF CARIOUS OSSICLES, NECROSED BONE AND OTHER OBSTRUCTIONS IN THE TYMPANUM. (Second Paper), WITH NINE ILLUSTRATIONS.

By H. V. Würdemann, M. D.,
of Milwaukee. *

WITHIN a few years otology has left the domain of medicine to become one of the factors of surgery. Indeed there are but few diseases of the parts comprising the organ of hearing that are not more amenable to surgical than to purely medicinal procedures. The reign of the copious hot water injection and the big syringe for all diseases of the ear from hyperacusis to furunculosis is over, and our field, although small in area, is quite as large as that of the laryngologist or gynecologist in the fertility of its expedients and the skill of its technique. About five years ago an English acquaintance strolled into the lecture room of that veteran otologist, Politzer, of Vienna; after listening to the professor for a while he remarked: "It was a pity that a man of such brain should tie his talents to such a small subject as the ear." Our friend took several courses of lectures which evidently changed his opinion as he is now engaged in practicing this small subject. And yet the last five years has seen a marked advance in aural surgery.

Numbers of persons having chronic suppurating ears allow the disease to run for years until forced to seek relief through recurring attacks of acute inflammation or one of the serious complications. Some have applied to physicians and even to those "making a specialty" of ear affections, have had gallons of water syringed into their ears, (paying liberally for the same), and dismissed with advice to buy a syringe and keep the ears clean. A few of these people live to a ripe old age, as do some with heart lesion, although slumbering over a volcano. Others die of some direct or indirect complication, as mastoiditis, meningitis, septicema or pneumonia. Many are so depleted by the constant drain on

*Read before Wisconsin State Medical Society, May 5th, 1893.

their system that they succumb to other affections which would have passed them by if they had been free from the aural lesion.

The cause of the meningitis or other fatal complication is often overlooked, mastoid inflammation is allowed to go on unnoticed until the occurrence of the graver affection which even then is not recognized until too late for operation. Two cases occurring during the month of March in this year illustrate this point. In the one, a physician had attended the case during an attack of catarrhal fever in which there had been an acute otitis media. He ceased his attendance and the ear was apparently neglected by the patient. Some time later, another physician being called in, found the patient with mastoid inflammation and meningitis. I was also consulted, but we decided that it was too late for operation and the patient passed away the next day.

In the other case the patient had a running ear for many years and was taken suddenly ill with chill, fever, and great pain referred to back of the head and side of face. She was treated for six weeks by three reputable physicians for "neuralgia, for typhoid fever and for fever." One of the attendants questioned about the condition of the ears and advised that a specialist be called in.

"A homeopathic aurist" arrived on the scene, left directions for the ear to be filled with boric acid powder and informed the family that the ear was not the cause of the other trouble. The people again "changed doctors," calling in Dr. S. W. French, who recognized the causus-morbi and brought me in consultation. We found indubitable signs of mastoid disease which had been evidently going on for some time. Secondary cerebro-spinal meningitis had likewise developed and she seemed in articulo-mortis. She died three days later, no post-mortem being obtained.

The treatment of chronic suppuration in the middle ear should be on the same lines that govern our procedures for suppuration in other parts of the body. We should endeavor to remove the cause and obtain free drainage just as the conscientious general surgeon does where there is necrosis of any of the bones, and empyema or like affections. Why should we not exercise sound surgical judgment and *remove the cause* where a like process exists in accessible portions of the tympanum? In these, old suppurating ears, cleansing methods fail, the caustic and astringent methods do not give relief, and in many cases even the antiseptic treatment is unsuccessful. Let us not follow in the footsteps of that famous perapatetic quack who stopped running ears in one treatment by

filling them with powdered plaster of Paris.[1] The cure for the time was effectual. It is reprehensible for the canal and middle ear to be packed full of boric acid, alum, or any other powder whereby the fetid products of decomposition may be retained and render septic absorbtion or other complication possible. We have been slow in applying the results of modern surgery until very recently to the removal of dead bone within the tympanum or in its walls. In this paper I advocate chiefly the operation through the canal for removal of the carious ossicles, necrosed bone and other obstructions to free drainage in the attic of the tympanum. Of course polypi and granulations should be removed wherever found and other minor surgical procedures done, as a routine practice, before attending to the necrosed tissue. I do not refer to the various phases of the mastoid operation, although a modified form of it is practised by Stacke and others where no signs of mastoid inflammation are present. I cannot conscientiously advise such a serious operation for the cure of suppuration within the tympanic cavity unaccompanied by the ordinary signs of mastoiditis. The operation done through the canal gives 70% of radical cures, fully half of the remainder being cured by subsequent treatment and the rest being greatly benefited by the better drainage. In the last named the necrosis may lie in the petrous portion even too deep for the radical operation of Stacke.

The lesser operation has the advantage in destroying but little of the healthy tissues, and in fully 50% of the cases the hearing is improved, whereas, after the mastoid operation, there are but few cases in which the sense of hearing is bettered, many being made worse. The technique of the operation has been well described in a number of papers, and my own method has not materially changed since I published my first series of cases two years ago.[2]

During the past year I have operated upon nine cases, (ten operations), all of whom were chronics, and most of whom had been under treatment for long periods of time. These do not include eight mastoid operations during the same period where the debris in the drum cavity was removed as a routine practice. Many of these patients were "rounders;" some had been to all the specialists that they could hear of, and had given each a fair trial. As I remarked last year at Detroit, I get tired of treating these cases after a few weeks and am disposed to suggest operation.[3]

[1] Dis. of Ear, St. John Roosa, 1885.

[2] The Treatment of Chronic Suppuration in the Middle Ear by Removal of Carious Ossicles, etc., H. V. Würdemann, *Medical Progress*. June, 1891.

[3] The Operation for Excision of the Ossicula, etc., H. V. Würdemann, Journal American Medical Association, Oct. 22, 1892.

In these ten operations the suppuration was cured in eight, (80%); suppuration lessened, but not stopped in one, (10%); undetermined in one; hearing improved in seven cases, (77%); about same in two, (22%). In no instance was the suppuration made worse or the hearing interferred with by the operation. As all of the cases recorded were deemed incurable by other than surgical treatment the results may be deemed "brilliant."

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

FIG. 6.

FIG. 7.

FIG. 8.

FIG. 9.

Fig. 1, Case I. Large perforation membrana vibrans with granulations on posterior rim of drumhead. Small perforation membrana flaccida. Malleus handle shortened through necrosis. Mucous membrane of tympanum red and shining.

Fig. 2, Case III. Large Perf. M. Vib. with granulations post. rim. Small Perf. M. Flac. Mal. handle necrosed. Intact N. chorda tympani lying just under upper rim. Opening of fenestra

rotundum at lower posterior portion of figure. Membrane red and smooth.

Fig. 3, Case III. Large perforation M. Flac. showing necrosed head of Mal. Scar of old healed perf. under umbo. M. Vib. intact.

Fig. 4, Case IV. Total destruction of drumhead revealing roughened and red mucous membrane over promontory. Opening of Fen. Rot. at posterior portion. Remains of thickened M. Flac. at upper portion.

Fig. 5, Case V. Same nature as in Fig. 4 with addition of polypi under M. Flac. and granulations on promontory.

Fig, 6, Case VI. Small Perf. M. Vib. and Flac. Bloodvessels along handle of malleus.

Fig. 7, Case VII. Total destruction M. Vib. with bands of adhesions from M. Flac. to promontory. Small polypi and granulations and thickening of M. Flac. Small Perf. in latter.

Fig. 8, Case VIII. Same as in Fig. 7 with addition of larger polypi appearing from under M. Flac.

Fig. 9, Case IX. Total destruction of M. Vib. with bands of adhesions from M. Flac. Carious malleus.

Case I. Miss E. S., æt. 25, city, referred by Dr. Wm. Meyer. Chronic suppuration R. E. following scarlet fever ten years before. Treated two years several times a week with an aurist with temporary benefit while under treatment. Several acute exacerbations during year. *Status Praesens*—H. D., watch pressure, whisper at 25 cm. Small perforation membrana flaccida, membrana vibrans destroyed, handle of malleus shortened through necrosis. (See Fig. 1). Patient anemic and complained greatly of her affection. I treated the case for one week then advised removal of the necrosed malleus. March 22, 1892, ether anesthesia at the Wisconsin General Hospital, Dr. J. S. Barnes assisting, I removed malleus, remains of drumhead and granulations from attic. Two days later there was no discharge and the ear has been dry to date of writing. Examination two months later; drum cavity dry, H. D., watch 25-150, whisper 2 meters. Had gained in general health and in weight. *Result*: Suppuration cured, hearing improved. Success.

Case II. Miss E. B., æt. 14, Reed City, Mich., referred by Dr. Walbridge. Chronic suppuration both ears following measles in babyhood. *Stat. Praes.*—Anemic and of scrofulous disposition R. E., H. D., 5-150, M. Vib. destroyed and malleus adherent to promontory as in Case IX, Fig. 9. L. E., H. D., 5-150, M.

Vib. and Flac. destroyed, tympanum filled with cholesteatomata, which when removed revealed polypi on promontory and thickened tissue as in Case V, Fig. 5. Adenoids in pharynx were removed. Case treated generally and locally for two weeks. Aug. 8th, chloroform narcosis, W. G. Hospital, Dr. Barnes assisting. I removed necrosed malleus R. E. with remains of drumhead and bands of adhesions with polypi in attic of L. E. No discharge L. E. after two days. Mucus persisted in R. E. for four weeks but was finally controlled by subsequent treatment. Returned home two weeks later much improved in general health and weight. No discharge; H. D., 25-150 R. and L. Wrote several months later the R. E. had discharged for several days during a severe cold but had ceased after injections of boric acid. *Result*: Suppuration cured, Hearing improved. Success.

Case III. Mr. A. P., æt 33, city; referred by Dr. Washburn. Chronic suppuration both ears following scarlet fever twenty-seven years before. Has been the rounds of the specialists for six years. *Stat. Praes.*—Anemic. R. E., H. D., 5-150, whisper 50 cm., large perforation M. Vib., small hole in M. Flac. shortened handle of malleus, granulations on posterior rim of drumhead. This case is specially interesting in that the chorda tympani nerve is intact and is plainly seen as in the sketch. (See Fig. 2). L. E., H. D., 25-150, large perforation in M. Flac. showing head of malleus. (See Fig. 3). I treated patient four months with benefit to left ear and general health but with amelioration of odor in the right. Sept. 11th, at W. G. Hospital, chloroform narcosis, Drs. F. D. Rogers and J. S. Barnes assisting, I removed necrosed right malleus and cleared attic. Two weeks later slight mucus discharge which has since been occasional but not enough to run out of canal. H. D., 30-150, whisper 4 meters, The left ear remains about the same but patient proposes to have that operated on later as he is much pleased with the improved hearing. *Result:* Suppuration lessened. Hearing improved. Partial success.*

Case IV. Mr. J. J., Racine, Wis., referred by Dr. A. B. Farnham. Chronic suppuration R. E. following scarlet fever twelve years before. Treated six months by injections, etc. *Stat. Praes.*—Robust, R. E., H. D., 15-150, M. Vib. entirely gone, mass of tissue upper part of drumhead, no malleus, rough bone felt with probe at tympanic ring and granulations seen in attic. (See Fig. 4). Dec. 15th, Drs. Farnham and Barnes

*I have since operated upon the ear of a twin brother of A. P. for same affection with success.

assisting, at W. G. Hospital, ether anesthesia, I removed remaining thickened mass of drumhead, broke up adhesions and removed small polypi from attic and curetted osseus ring. Ear dry after third dressing, H. D., 15-150. Patient returned two months later with coryza and slight mucus discharge from middle ear which was relieved in a few days by antiseptic injections. Since that time he is believed to have been well. *Result:* Suppuration cured, hearing about same. Success.

Case V. Mr. J. M., æt. 18, city, referred by Dr. J. S. O'Brien. Chronic suppuration L. E. following scarlet fever fifteen years before, treated with a number of specialists for several years. Temporary benefit as long as the canal was kept clean by washing. Fetid odor persisted even after three months of antiseptic injections. *Stat. Praes.*—Anemic H. D., L. E., 10-150. Membranes gone as in Case III, glairy evil-smelling discharge, granulations about promontory. (See Fig. 5). The latter were removed by ring curette and case treated for three months before patient decided to accept operation. Jan. 6th, 1893, Dr. Barnes assisting, ether anesthesia at W. G. Hospital. I removed the hypertrophied remains of drumhead and a mass of polypi from attic which were not before visible. Osseus ring likewise curetted. Patient did well for one week and then contracted a coryza with acute catarrhal discharge from operated ear. This was subdued by subsequent treatment in three weeks and since that time the ear has been dry. H. D., 10-150, has much improved in general health. *Result:* Suppuration cured, hearing same. Success.

Case VI. Mr. G. L., æt. 23, Columbus, Wis., referred by Dr. Bellack. Chronic suppuration L. E. following scarlet fever fifteen years before. Had kept ear cleansed by occasional injections. *Stat. Praes.*—Apparent good health. L. E., H. D., 5-150, whisper 1 m. I treated ear two weeks reducing discharge in quantity but not diminishing bad odor. Small perforation in M. Vib. and small one in M. Flac. (See Fig. 6). Feb. 3rd, Dr. Barnes assisting, ether anesthesia, W. G. Hospital. I removed all of drumhead, necrosed malleus, a piece of dead bone which was believed to be part of the incus and small polypi from attic. Ear dry after third dressing. Ten days later he returned home; wrote several weeks later that for a couple of days there was mucus on cotton which he kept in canal but which disappeared upon syringing with boric solution. At last accounts ear was apparently well. H. D. 15-150, whisper 3 m. *Result:* Suppuration cured, hearing improved. Success.

Case VII. Miss A. J., æt. 6, Kenosha. Chronic suppuration both ears following scarlet fever with meningitis one year before. Patient could both hear and speak before the attack but is now totally deaf and has forgotten most of her words. No previous treatment besides syringing. There had been much suppuration and she had complained greatly of recurring attacks of pain. *Stat. Praes.*—Anemic but intelligent and bright. Both canals filled with foul-smelling pus. M. Vib. of both absent, mucus membrane highly congested. R. E. small perforation in M. Flac. mass of small polypi extruding from under posterior rim of drumhead and down from attic. (See Fig. 7). Mallei apparently absent. Treated the case antiseptically, stopping discharge permanently in left after ten days. Removed polypi and treated right for nearly two months but discharge still continued. Feb. 3rd, Dr. Barnes assisting, chloroform anesthesia, W. G. Hospital. I removed remains of drumhead, polypi from attic and dead bone from osseus ring. Subsequent mucus discharge cured in two weeks by injections. No recurrence since that time. No improvement in hearing. *Result:* Suppuration cured. Success.

Case VIII. Miss B. C., æt. 22, city. Chronic suppuration L. E. following scarlet fever ten years before. Treated by syringing and afterwards neglected. *Stat. Praes.*—Anemic. Fetid discharge R. E., large polypi in meatus, after removal showing others arising in attic, M. Vib. gone, small perforation M. Flac., apparently no malleus but position occupied by mass of thickened tissue. Removed polypi several times within four months and treated antiseptically but suppuration continued. H. D., no watch, whisper 25 cm. Feb. 15th, Dr. Barnes assisting, ether anesthesia, W. G. Hospital. I removed remains of drumhead and polypi from attic and curretted osseus ring where bone was found rough. In the debris I found the necrosed incus. Patient had occasionally small amount of mucus in the middle ear and is yet under observation. H. D., watch 30-150. *Result:* Undetermined as regards discharge; hearing improved. Success.

Case IX. Miss M. B., æt. 17, Wauwatosa, referred by Dr. Lindenschmidt. Chronic suppuration R. E. following scarlet fever seven years before. Had been treated for months by an aurist. *Stat. Praes.*—Fair health, L. E., H. D., 3-150, necrosed malleus with remains of M. Flac. and bands of adhesion to promontory cholesteatoma in canal. (See Fig. 9). I treated ear one month, and April 27th, chloroform narcosis, W. G. Hospital, Dr. Barnes assisting. Removed necrosed malleus and remains of

drumhead. Sour taste in end of tongue for two days afterwards. Ear dry three days after operation but several days later patient contracted severe cold and for two weeks there was mucus discharge in middle ear with herpes of canal and external ear; the latter of which may have been due to the iodoform gauze tampon. May 15th. The ear has been dry for several days and H. D. 60-150. *Result:* Suppuration cured; hearing improved. Success.

805 Grand Avenue.

ABSTRACTS OF PAPERS AND REPORTS OF CASES PRESENTED BEFORE THE SECTION ON LARYNGOLOGY AND RHINOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

By Wendell C. Phillips, M. D.,
of New York.

DR. CHAS. H. KNIGHT, the chairman, presented a case with cyst of the epiglottis in a patient, a colored man aged 40 years, who came to the clinic with a ready-made diagnosis of cancer of the larynx. On inspection the epiglottis was found to be pendulous, shutting off all view of the larynx. On producing retching, a round body popped into view; it was pale in color, about the size of a hickory nut, elastic to the touch, and attached to the lingual face of the epiglottis. It was removed without any difficulty and was found to be a cyst filled with turbid serum. The cut surface occupied the entire left margin of the epiglottis. After excision of the cyst the epiglottis did not resume its normal position, showing that this mass must have been there for a long time. The clinical history of the case was rather peculiar. The man had no symptoms whatever until three weeks ago; then he said he felt he had something in his throat that he wanted to swallow. He only experienced slight pain; there was no trouble in breathing; there was no cough until within a week or two.

Dr. H. Hoyle Butts read a paper on "A new method of controlling tonsillar hemorrhage." He first reviewed the various methods that have been recommended for controlling persistent hemorrhage after tonsillotomy. Of these, the simplest and most successful method has been that of direct pressure to the bleeding surface. So far the mechanical aids to this procedure have been found

faulty in contrivance or impracticable for actual use, and the surgeon has been obliged to resort to the use of his fingers. At best, digital compression must be limited, uneven and unsatisfactory, as the hands become tired. Dr. Butts presented an instrument which he has devised for the purpose of controlling tonsillar hemorrhage. The instrument is readily placed in position, it is well borne by the patient and its effect may be noted when it is *in situ* by the use of the head-mirror. The tonsillar hemostat is made by C. E. Riker, of this city.

Dr. Knight stated that the subject of persistent hemorrhage after tonsillotomy is a very important one. He has had no experience thus far with the instrument presented by Dr. Butts; theoretically, it ought to accomplish the desired object with much greater ease than the fingers of the operator.

Dr. Chas. H. Knight reported "A case of empyema of the antrum, illustrating, first, the necessity of cleaning out the middle meatus, and second the resistance of hyperemic ,mucus membrane to cocaine anesthesia." The patient was a man aged 28 years, a physician engaged in active practice in the West. When he was 20 years old he had an attack of scarlet fever, and typhoid fever a year later. Ever since then he has suffered more or less from catarrh. He had repeated severe colds, to which he never paid proper attention. His catarrhal symptoms finally became so aggravated that he underwent a course of treatment, having considerable nasal tissue removed with the snare, etc. He still suffered from the profuse secretion, and from pain in the right infra-orbital region. Two years ago it was discovered that he had antral disease, and an unsuccessful attempt was made to reach the cavity through the canine fossa. Later, the antrum was opened through the alveolar process, and a large quantity of offensive pus was evacuated. For two months the cavity was frequently washed with antiseptic solutions and then the opening was allowed to close. The symptoms continued and some months later the antrum was again opened in the same situation and washed out daily with peroxide of hydrogen, carbolic acid, etc., with only a temporary effect. In the meantime, no attention whatever was paid to the condition of the nasal fossa. For the past eight months the discharge of pus has been profuse and the pain severe. The patient became run down and excessively depressed. He was in this condition when he came under Dr. Knight's observation. The diagnosis of empyema of the antrum was confirmed very graphically with the electric light. A rhinoscopic examination was made

and disclosed a very hyperemic condition of the mucus membrane in the right nasal fossa, with enormous hypertrophy of the middle turbinated body. Its anterior portion was beginning to undergo polypoid degeneration. The mucus membrane was extremely hyperesthetic, so much so, that a 10 per cent cocaine solution had no effect whatever upon its sensibility. In spite of frequent and thorough spraying and the introduction of crystals of cocaine on pledgets of cotton, the hyperesthesia persisted. The middle turbinated bone was removed almost entirely with the cold wire snare, exposing the ostium maxillaræ and restoring the patency of the middle meatus. A spray of menthol in albolene (five grains to the ounce) was ordered. Following the operation there was at once a decided diminution in the quantity of the discharge, its fetor disappeared and at the expiration of ten days the patient reported that during the preceding twenty-four hours the discharge from the nose had been less than one ounce. The hyperesthesia of the nasal mucus membrane also disappeared; the membrane became normally sensitive and the effect of cocaine was quite obvious. While the case was by no means unique, it was interesting on account of the rapid and marked improvement following removal of the middle turbinated bone, and also on account of the resistance of the tissues to cocaine anesthesia.

Dr. James E. Newcomb said he has observed several marked instances of the resistance of hyperemic tissues to the effects of cocaine. The double salt of cocaine, known as phenol-cocaine, seems to have a better effect in such cases. Dr. Newcomb also referred to those patients who seem to show a marked susceptibility to cocaine poisoning. He thought such unpleasant effects were due, not to the cocaine, but to the heat of the room, the odor of the carbolic acid, etc. Usually, in such cases, we see no dilatation of the pupil, no hurried respiration, no disturbance of the circulation—in fact, none of the classical symptoms which we associate with cocaine toxemia.

April 26, 1893.

OPERATIONS UPON THE EYE FOR COSMETIC EFFECT.*

By G. Melville Black, M. D.,
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WITHIN this realm of surgery there is much that is in dispute as being justifiable. It is claimed by the most conservative that operations upon the eye are not warrantable except to restore or increase vision.

A disfigured eye detracts very greatly from the personal appearance of the individual, as well as from their personal comfort, as they are constantly reminded by the curious gaze, or an inquiry, that their abnormality is noticeable and a subject of comment.

If the defect is small, such as divergence or convergence of the optical axes, a pterygium, a partial leucoma of the cornea, monocular mydriasis, or cataract, it is a puzzle to new acquaintances, and continues to be so until they get used to the appearance, inquire into it, or have a good look at it. As a rule, so long as the trouble is not understood by these inquisitive persons, and it is surprising how many of them there are in this world, just so long, as a rule, will they continue to notice the defect.

If the possessor of the abnormal eye is sensitive on the subject, and the majority of them are, the actions of their friends and acquaintances will be a source of much annoyance.

Let a young or middle aged person have a cataract in one eye only, of course he knows what his ailment is, and if he is sensitive on the subject, he is painfully aware of it. His acquaintances notice that the pupil of that eye is white instead of being black, and not being cognizant that he has a cataract, as the majority of people do not know what a cataract is, they are not conscious that

* Read before the Colorado State Medical Society, June 21, 1893.

the eye is sightless and sooner or later wound his feelings by asking him, "What is the matter with your eye?" This constant annoyance finally becomes tiresome and he seeks an oculist to see if something can not be done to render the defect less conspicuous. He is probably informed that he had better leave it alone for the reason that if it is operated upon, it will not work with the fellow eye, that he will probably see double, that he stands a chance of losing the eye altogether, or if the operation being only a partial success, and the result cosmetically not as good as before the operation.

Another patient consults the oculist for divergent squint and is informed that it requires an extensive operation to correct the deformity and that he had better leave it alone.

The party with the partial leucoma of the cornea comes in, and he is informed that a tattooing operation might be done with some benefit, but that it is not always a success, and that sometimes the operation sets up a violent inflammation requiring him to lay up for some time from business and that he had better not have anything done.

The man with the pterygium comes in, and if the growth has not extended far enough over the cornea to interfere with vision, he is advised to let it alone for a time.

This to my mind is the reason why we see so many people who labor under the disadvantages spoken of. Their appearance is a source of trouble to themselves and to the people with whom they come in contact.

Within the last few years the operation of cataract extraction has been made one of the most successful in the line of surgery. Only in about 2 per cent is the eye totally lost, and 3 per cent more will cover the failures. A total of 5 per cent would be called unsuccessful from a cosmetic point of view. These are statistics of cataract operations in general, both of the old and the young as subjects, and with a view of restoring vision in the majority, and for the cosmetic result in the minority. I do not believe the percentage of failures would be as great as five cases in the hundred in selected cases of cataract in young subjects.

It is to be remembered that we are not operating for a visual result, and if the eye is not corrected by a glass the vision is not enough in this eye to interfere with its fellow, as the image formed upon the retina of the two eyes will be so dissimilar that the less distinct image, or the one formed upon the retina of the eye operated upon will be suppressed and double vision will not result.

This double vision theory is frequently submitted to the patient as one of the reasons why the eye should not be operated upon. If the refraction of the eye is corrected, as a matter of course diplopia will result and the result cosmetically ruined, as a strong cataract glass is anything but a comely addition to the face.

There is no more probability of the eye "turning out" after the operation than before. If divergence has already taken place before operating, a double defect presents itself for correction, If, then, to recapitulate, the eyes are straight before operating, the latter does not increase the disposition to divergence.

The operation of simple extraction, i. e., where an iridectomy is not performed, leaves the eye in appearance equal to its fellow, as I have had the pleasure of demonstrating to myself several times.

In divergent squint the operation of advancement of the internal rectus muscle is not indicated except when the amount of divergence is extreme.

The operation of Gruening has proven to be quite successful in cases of moderate divergence. This operation consists in doing a tenotomy of both external recti muscles, and drawing the eyes into marked convergence by a thread inserted into the sclera to the nasal side, and close to the cornea of each eye, being tied in the median line over the nose. A wire bridge to fit over nose with eyelet at each end for threads to pass through has been devised to hold thread down on a level with its point of insertion into sclera. The operation of advancement, if done dexterously, is successful where the operation of Gruening would fail, and does not involve but slight danger, one case in a hundred being lost from ophthalmitis. I believe this one case could be eliminated from our statistics, if it were not that so many operators adopt such poor methods of doing the operation.

In partial leucoma of the cornea, a tattooing operation involves no danger at all scarcely, is very simple and improves the appearance of the eye greatly. The irritation rapidly subsides and the patient is scarcely prevented from his usual routine of life. If the leucoma is total, the tattooing should be done at repeated sittings, thereby obviating the reaction that would naturally follow such an extensive pricking of the cornea.

Pterygii should be removed as early as possible, and not allowed to continue until serious and irreparable damage has resulted to the cornea. A pterygium which has only begun to encroach upon the cornea will alter its curvature so that in some cases glasses will

be required forever after to correct the astigmatism which has resulted therefrom.

Sufficient diseases of the eye have been mentioned for which operations to improve the personal appearance of the patient are indicated. Therefore I will not prolong this paper by citing others.

Why allow the patient to be annoyed by an unsightly deformity when it is his desire to be relieved of it, and it is within our power to interfere with all the chances in favor of a good result. It may seem somewhat strange to you that this is not done. Look about you and see how many remain without surgical aid. Ask these people and you will find they are bearing with their infirmity because they have been advised by some oculist not to meddle with it.

Steele Block.

INTUBATION IN AN ADULT FOLLOWED BY A FATAL EDEMA OF THE LARYNX AFTER EXTRACTION OF THE TUBE.

By Max. Thorner, A. M., M. D.,

of Cincinnati.

Professor of Clinical Laryngology and Otology, Cincinnati College of Medicine and Surgery, etc.

In a lecture delivered before the Harveian Society of London, Feb. 2, 1893, Mr. Edmund Owen remarked: "It would almost seem that operating surgeons inhabit a region of perpetual sunshine of success; or, at any rate, that their meterological apparatus possesses no arrangement for registering a depression, and still less a storm ..... The circumspect surgeon is he who silently acquires knowledge from his mistakes; the honest one is he who boldly places his sorrowful experience within the reach of every practicer of his handicraft."

After the brilliant results achieved by O'Dwyer's method in the treatment of acute obstructions of the larynx, it was but natural that the same method should be resorted to for the relief of chronic laryngeal stenosis. When Lefferts, at the Tenth International Medical Congress, in 1890, recorded his first series of intubations for chronic stenosis of the larynx, it was at once apparent that this operation would soon supercede the older methods of treatment, which was in a moderate degree only successful, while a serious complication was added by the preliminary tracheotomy that they generally required.

Intubation, however, with the large tubes especially constructed for this purpose, seemed to be not only more efficient, but at the same time perfectly safe. That no method, however ingeniously contrived, is exempt from unfortunate accidents, the following case will show:

J. B., 18 years old, consulted me Aug. 15th, 1892. Since eight years he had been suffering from what was considered asthma, the dyspnea having increased of late to an alarming extent. The history was entirely negative; syphilis could not be traced. The patient appeared to be in great distress. His respiration was labored, noisy and accelerated; on exertion, his face had a livid color and was covered with a cold, clammy perspiration. The stenosis of the larynx was extreme. The ventricular bands were greatly thickened, and the vocal cords buried in masses of infiltrated tissues. The encroachment on the lumen of the larynx increased in the subglottic space, the opening for breathing being scarcely the size of a thin lead pencil.

After a few days the smallest tube of the set for adults, made according to Leffert's directions, by Tiemann & Co., of New York, was introduced without any difficulty. The tube is somewhat larger than the largest tube of the set used for children. Before it was introduced it was well oiled, and the larynx anesthetized with a five per cent. solution of cocaine. The patient could readily breathe through the tube and complained of no pain. It was my intention to permit the tube to remain in the larynx for twenty-four hours; but on the following morning, about fifteen hours after the introduction, the patient returned and begged me to remove the tube. He stated he was greatly annoyed by it and could not take any food whatever. I extracted the tube without any difficulty with the understanding that it was to be reintroduced in the evening. The patient was relieved, was able to take some water, and left my office after a few minutes feeling comparatively comfortable,

About fifteen minutes after he had left me I was called to the street, about a half square away, where the patient was lying dead on the sidewalk, He had walked about one and a half squares from my office when he felt bad and asked a driver of a passing wagon to take him to my office. Scarcely had he been seated when he fell back. The driver stopped and with the aid of some passers-by lifted him from the wagon. When he reached the sidewalk he was dead. A physician who happened to pass there shortly afterwards found no sign of life in him.

The unfortunate accident can be easily explained. After the pressure exercised for fifteen hours by the tightly-fitting tube upon the infiltrated tissues had been suddenly relieved, a subglottic edema ensued causing a fatal issue within a short time.

This rather unusual case teaches us a lesson to keep a patient upon whom intubation for a chronic stenosis of the larynx has been practiced under strict surveillance for some time after the extraction of the tube.

141 Garfield Place.

THE ORIGIN OF GLAUCOMA AND A SUGGESTION AS TO ITS EARLY MANAGEMENT.*

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OF PHILADELPHIA.

OPHTHALMIC SURGEON TO ST. MARY'S HOSPITAL, ETC.

I DO not desire to present any novel ideas with regard to the origin of glaucoma, or to recommend any special treatment of its earlier manifestations. My object is rather to direct attention to what I believe to be the principal cause of glaucoma simplex and acute inflammatory glaucoma, and to suggest the use of well-known remedies for a condition which may prove the starting point of the disease. The nature of this obscure trouble has always been a subject for speculation from the earliest days of medicine, but it is only comparatively recent that its pathological character was understood. The work of the anatomist, the phisi-

*Read before the Ophthalmological Section of the American Medical Association at its meeting in Milwaukee, June 6th, 7th, 8th and 9th, 1893.

ologist, the pathologist and the clinician have shed much light upon what was obscure to the older physicians. Until the time of Von Graefe, the character of glaucoma was very obscure, his discovery of its general character was a very great step forward, but left unexplained how or why the increase in intra-ocular pressure was caused. The circulation in the eye and the nature of the ciliary body were then not understood, but Von Graefe was shrewd enough to refer the cause of the pressure to a disturbance of the circulation. When the anatomist and physiologist had made clear the wonderful method by which the nutrition of the structures of the globe is maintained and had proved the existence of a current from the ciliary body through Schlemm's canal and into the triangular space, it was seen how obstructions of these small channels might readily cause such a disturbance in secretion and excretion as might cause an increase of intra-ocular pressure and thus the symptoms of glaucoma, and if maintained, the disease itself.—(Knies and Weber.)

Any cause which produces a rise in the intra-ocular pressure will give rise to some at least, of the common symptoms of glaucoma. They may be produced temporarily in the normal eye by a simple practice that I have often adopted. If the head of a subject possessing normal eyes is held in a dependent position and at the same time pressure is made on the eye-ball for a short time, the subjective symptoms produced will be similar to those of disease. The globe becomes tense to the trained touch, chromatic rings surround a bright point of light, and these symptoms, accompanied by severe pain, if the experiment is carried far enough, and occasionally ciliary neuralgias are produced. These symptoms are evidently due to a disturbed circulation, and the study of the pathological conditions existing in glaucoma has confirmed the reasoning of the anatomist and physiologist. The cupped disc shows the effect of the intra-ocular pressure and where inflammatory processes have been set up their effects are found in the ciliary region. The cause of the increased intra-ocular pressure has therefore been justly assumed to be a disturbance in the fluid circulation of the eye. But what should cause disturbance in a body so remote from external influence as the ciliary body? To this question no entirely satisfactory answer has yet been made, and I would therefore suggest that a further inquiry be made to determine the more remote causes of these changes in the circulation. It is very well known that the blood circulation is under the control of the sympathetic nervous system, and that these nerves are well supplied to the various tissues of the eye; undoubtedly

many, if not most of these are efferent, but undoubtedly, also many are afferent and control the circulation in the arteries of the eye. Remembering how frequently the blood vessels are acted upon by purely nervous influences of varied character and how quickly purely normal and transitory changes may be rendered pathological, I could not but imagine that some, if not many cases of glaucoma were caused by the result either of repeated sympathetic shocks to the muscles controling the blood vessel system of the eye with resultant venous stasis, or even as the result of a single severe shock which acted as a paralyzant to the sympathetic system of nerves. The idea is not new, as Donders long ago referred to this, but I believe that its therapeutic importance has not been enforced. Von Graefe thoroughly recognized the importance of a variation of the vascular pressure as causative of glaucoma, whether inflammatory or not. He considered the origin of these variations to be intra-ocular, but, with our present knowledge of reflex action, this restriction is unnecessary.

That the pressure of fluid regulates the outflow so that when the afflux is increased a compensatory increase of the efflux occurs.—(Snellen). Can this hold good in an eye subjected to so frequent variations of pressure as occur in glaucoma? In regard to the effect of nervous shock as causative of glaucoma, I may quote Laqueur, who states that the symptoms of glaucoma often appear after sudden attacks of fright or anger, after sleeplessness, violent and exhausting labor, etc. Several cases which have occurred lately in my own practice have brought the same facts frequently before me.

Case I.—Mary F., aged 41, four living children, two dead, no miscarriages, says: "Enjoyed good health until ten years ago, since which time have been exceedingly nervous, following an attack of typhoid fever." (Case referred by Dr. John H. Locke.) Sight good until the sudden death of husband, at which time she fainted, on recovery from the faint found herself blind in the right eye, with partial loss of vision in the left. Ten days later acute inflammatory glaucoma in both eyes. Marked hysteria and melancholia. The case progressed in the usual manner. Iridectomy on both eyes.

Case II.—Mrs. K., aged 55, eight children, three living, no miscarriages, says: "Always enjoyed comparatively fair health." Dates the gradual loss of vision from the time of an unfortunate accident, causing the loss of several lives for which her son was in a measure responsible. Left eye, absolute glaucoma; right eye, glaucoma simplex. Iridectomy on right eye.

Case III.—K. H., aged 39, no children, no miscarriages. Dating from sudden death of father and subsequent family trouble. Her sight has been more or less bad; large, deep glaucomatous cup in

right eye, shallow excavation with tapering of the veins in the left eye. Arterial pulsation, increased tension; patient refused operation.

CASE IV.—F. O., aged 55 years, cigar maker. Patient profoundly neurasthenic and hysterical; similar history as to family troubles and great mental strain. Case of glacoma simplex.

In all of the above cases they were referred to their accustomed medical attendant. No organic trouble was reported with the exception of the second case, where albumen was found in the urine.

I do not wish to be understood as insisting that every case of glaucoma simplex, or acute inflammatory glaucoma has necessarily a nervous origin, or that the disease is *always* caused by reflex action through the sypathetic nerves. I believe, however, that a majority of cases can be traced to a nervous starting point, and it is to the cases thus caused that I wish to direct your attention.

The prodromes of glaucoma are exceedingly obscure, occasionally they seem to be wanting altogether, but cases not rarely occur in which while there is no definite indication of glaucoma, nervous symptoms manifest themselves which indicate the possible development of the disease. Such cases, if looked for, will develop in every ophthalmologist's practice, and while it is of all the difficult problems of medicine most difficult to prove "what might have been." Observation has convinced me that glaucoma can be warded off, so to speak, by the use of the best means known to the neuralogist for strengthening the nervous tone. In this event the case passes from the care of the ophthalmologist to the expert in nervous diseases, but I have seen in my own practice most beneficial results from the use of strychnia in moderately heavy doses, and in one case especially a long sea voyage has resulted apparently at least, in the prevention of the threatened disease. I do not think that the ophthalmologist should be called upon to treat such cases but they should be given the best advice as to hygiene and medicine that the present status of medical progress affords. As to the effect of electricity either local or general in such cases, I am not in a position to speak, but I believe that it might be highly beneficial.

Of course, after the disease has developed there is nothing but the old routine to employ. Early iridectomy and the use of eserine comprehend the sum total of the treatment. It is in the earlier stages of the disease that the glaucoma offers the best prospect for useful therapeutic study, and it is to direct your attention to this study that I have engaged so much of your time.

1762 Frankford Avenue.

ANNALS OF OPHTHALMOLOGY AND OTOLOGY

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NEW INSTRUMENTS.

THE NASAL DOUCHE. By Leonard A. Dessar, M. D., of New York.

In an article written a year ago* I called attention in detail to the advantages of nasal douching over all methods of cleansing the nasal passages. Since that time I have received numerous inquiries as to the apparatus which I recommended for that purpose. It is necessary to reiterate here a few of the objections which apply to the other appliances in use for nasal douching. It has been demonstrated by Roosa, Knapp, McKenzie and others, and their experience is corroborated by every specialist, that catarrhal and purulent diseases of the middle ear not infrequently results from the use of the ordinary douche in consequence of the entrance of fluids into the Eustachian tube. The main objection which I would urge against the use of the ordinary douche in rhinological practice is that very few patients possess the requisite amount of skill to warrant its being given into their hands.

*International Journal of Surgery, May, 1893.

I have frequently observed, in spite of specific directions regarding its use, so much resulting ear trouble, that I was led to devise an instrument which by reason of its simplicity is perfectly free from risk and can readily be employed by any patient of average intelligence.

The original instrument I have modified and somewhat slightly altering its shape and providing it with depressions at the sides for more convenient handling.

The modified cup is made both of hard rubber and glass by Messrs. Tiemann & Co., of New York. I think it may prove of interest to repeat here the rules relating to the use of the douche, which appeared in the article referred to above.

By observance of the precautions suggested therein the application of the douche is rendered entirely devoid of risk.

PRECAUTIONS IN THE USE OF THE DOUCHE.

The following rules should be observed in the use of all nasal douches:

1. The handkerchief should not be used for at least ten minutes after douching, inasmuch as in blowing the nose any fluid remaining in the nasal passages may by a Valsalva action be forced into the Eustachian tube.

2. After douching it is advisable for the patient to remain in doors so as to avoid exposure to the cold air.

3. During the proceeding the patient should not be disturbed or excited, as this may give rise to an involuntary attack of sneezing, coughing or swallowing, and thus render it possible for fluids to enter the middle ear.

4. Before beginning the douching, a careful examination should be made to see whether both nostrils are free. If one of them is found to be obstructed the douche should be used on the affected side.

5. Plain water should never be employed for douching as it loosens the nasal epithelium. The addition of a small amount of sodium chloride prevents this action.

6. Concentrated solution should never be used as a douche.

7. It is not advisable to douche the nose more than three times daily, as a rule, its application morning and evening is sufficient.

8. The quantity of fluid introduced should not exceed ten ounces, the average amount varying from five to ten ounces, i. e., from one to two douche cupfulls for each nostril.

9. The fluid should always be "luke warm."

ON TATTOOING—A NEW INSTRUMENT. By C. Barck, M. D., of Saint Louis, Mo.

In going through the different text-books I find that a satisfactory instruction, how to tattoo, is given in none of them. The advice seems to be uniformly simply this, to die the white spot or the whole whitish cornea black. By this method the appearance is no doubt somewhat improved. But in cases of larger or complete leucomata, to which I refer here mainly, the effect thus produced is anything but resembling a natural eye. Why? Because the most characteristic feature, the black pupil in the center is wanting. To attain this, it is necessary to color a round spot in the center and leave an area around it unstained so that the pupil shows by contrast. The periphery again is tattooed. But whilst the pupil is stained as intensely black as possible, the peripheral ring is not dyed so uniformly, more grained, so to say, as to resemble somewhat the iris. We might therefore call it the iris-ring. In the special instances the iris of the healthy eye is to be imitated as to the shade of color.

Whilst I have proceeded on this plan for years I have always felt that there was something wanting to make the result a perfect one. Only an artist-draughtsman is able to make the pupil and the inner borderline of the iris-ring absolute circles and parallel to one another. To do away with this difficulty, I had the little instrument shown in the illustration constructed.*

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*The instrument was made by Holekamp, Grady & Moore, of Saint Louis, Mo.

It consists of two parallel cutting rings, one within the other. The inner circle is 3 mm. in diameter and that of the outer 5 mm. The inner one to mark off the pupillary space, the outer one to define the inner border of the iris-ring. The interspace corresponds of course to the unstained area.

A moderate pressure and slight rotatory movement suffices to produce the necessary impressions.

These landmarks are to be stained at once and they will then remain visible and serve as a guide. The process of tattooing is then finished as outlined above.

I can recommend this little instrument and method, as only by the sharp defining of limits and the contrast of coloring my results have become satisfactory from an artistic point of view.

A New Aseptic Eye Instrument Case. By James Pleasant Parker, M. D., of Saint Louis, Mo.

Outside dimensions 4x7x1½ inches.

The case is of hard rubber, seamless and has hinges and clasp. It has a removable hard rubber septum that holds the instruments in place when the case is closed. The case is made in a mould, not pressed, and will therefore not lose its shape when immersed in hot water. The instruments rest upon metal nickel-plated racks, which keeps them free from moisture. The racks can be removed for the purpose of cleansing. The case has no velvet lining and is *absolutely aseptic.*

It contains:

1 Parker's scissor-action eye speculum.
1 Fixation forceps (with catch).
1 Strabismus hook.
1 Strabismus scissors.
1 Graefe's cataract knife.
1 Iris forceps.
1 Iris scissors.
1 Cystitome.
1 Graefe's cataract spoon.
1 Daviel's scoop.
1 Paracentesis needle.
1 Beer's cataract knife.
1 Weber's canaliculus knife.
1 Set Bowman's probes.
1 Angular lance-knife.
1 Gouge-shaped knife for foreign bodies.
1 Spud for foreign bodies.
1 Jager's hard rubber plate.
1 Epilating forceps.
1 Enucleating scissors.
1 Needle forceps.
1 Bottle assorted needles; China bead silk, etc.

The scissor-action speculum is commended for its simplicity and convenience. It is without spring or screw, and has the action of scissors. It is introduced, closed, and with the thumb and third finger in the scissor handles—the first and second fingers being used to steady the instrument—the eyelids are separated by pressing together the scissor handles and the ratchet is fixed with the second finger.

It is obvious that with such a speculum, controlled by the fingers of the operator, the eyelids can be separated more gently and with less annoyance to the patient than can be done with the old style speculum having spring and screw. The instrument is readily removed from the eye by releasing the ratchet. The illustration (of the speculum in the case) shows the instrument as it was made of wire, but it has been very much improved by having the shanks made of broad, flat, thin steel, which makes it lighter and more rigid than the wire.

I am indebted to Messrs George Tiemann & Co., of New York, for making the speculum and handsome hard rubber case.

BOOK NOTICES.

DISEASES OF THE EYE. A PRACTICAL TREATISE FOR STUDENTS OF OPHTHALMOLOGY. By George A. Berry, M. D., F. R. S. C., Ed., Ophthalmic Surgeon Edinburgh Royal Dispensary; Lecturer on Ophthalmology Royal College of Surgeons, Edinburgh. Second edition revised and enlarged, with colored illustrations from original drawings. In one octavo volume of 745 pages with 197 illustrations, eighty-seven of which are beautifully colored. Cloth, $8.00. Philadelphia, Lea Brothers & Co., 1893.

The thorough revision of Berry's book has resulted in a volume largely increased in text and illustrations and the practical character has been maintained.

The work is distinguished by its profusion of beautifully colored illustrations which are scattered throughout the text and placed in close connection with the matter to which they relate—an obvious point of convenience for the reader. It is an admirable book and will henceforth occupy and hold its place as one of the best treatises upon the subject we have. It is to be regretted that it gives no instruction as to the use of a Mydriatic and difficulties that surround the details of finer refraction—work as carried out in America, but the chapter on refraction is better than is found in most books by European authors.

DIAGNOSIS AND TREATMENT OF DISEASES OF THE EAR, NOSE AND THROAT. By eminent American, British, Canadian and Spanish Authors. Edited by Charles H. Burnett, A. M., M. D., Emeritus Professor in the Philadelphia Polyclinic and College for Graduates in Medicine; Clinical Professor of Otology in the Woman's Medical College of Pennsylvania; Aurist to the Presbyterian Hospital, Philadelphia. To be completed in two volumes of about 800 pages each. Price per volume, Cloth, $6.00; Full Sheep, $7.00. Philadelphia, J. B. Lippincott Co.

The first volume of this practical and comprehensive treaties is devoted to the ear, the nose, and the naso-pharynx, and is composed of papers by eminent authorities upon the various sub-divisions named. In these papers the authors have succeeded in giving practical conclusions arrived at by other investigators and by themselves and have avoided discussing theories. The special attention to diagnosis and treatment greatly enhances the value of the book and renders it especially useful to the busy practitioner.

It is illustrated with numerous text-cuts, chromo-lithographs and half-tone reproductions from photographs. The anatomy and physiology of the ear, the nose, and the naso-pharynx is well presented. The paper on Chronic Catarrh of Middle Ear, and the one on Chronic Purulent Otitis Media are masterly productions. All the papers are good. It is a complete, exhaustive, and authoritative treatise on diseases of the ear, nose and naso-pharynx.